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The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

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DISEASES CAUSED BY BACTERIA AND FUNGI

MINETT, F. C. (1939). **Prevention of Ovine Mastitis by the Use of Staphylococcus Toxoid.**—*J. comp. Path.* **52.** 167-182. 5 tables, 5 charts. [Numerous refs.]

M. concludes from a series of experiments that treatment by subcutaneous injection of specific staphylococcus toxoid prevents the general effects and, to a considerable extent, the local effects resulting from an infusion of staphylococcus culture and toxin into the udder of ewes. Although the ewes used in the experiment were in nearly all cases non-lactating and kept indoors under laboratory conditions, M. believes that toxoid would act similarly in nature. Two injections of toxoid at an interval of about three weeks gave a better immunity than one dose, and the immunity was evident for at least three months after the second injection. In a single experiment, one dose of alum toxoid (5 c.c.) gave a rather better immunity than two doses of unprecipitated toxoid or smaller doses of alum toxoid.

The amount of antitoxin which developed in sheep treated with toxoid tended to be greater in animals which had higher pre-injection titres. In sheep judged to be adequately protected, antitoxin levels averaging 8-24 units per c.c. serum were observed 10-20 days after treatment, representing increases as high as 6-15 times the pre-injection titre. Unprotected sheep with low antitoxin titres suffered more severely from the test inoculation than those with higher titres. The article is preceded by a review of the literature on ovine mastitis with particular reference to the staphylococcus form of the disease.—A. W. STABLEFORTH.

MINETT, F. C. (1939). **The Control of Chronic Streptococcus Mastitis.**—*J. comp. Path.* **52.** 266-272. [17 refs.]

This article gives an account of a small self-contained herd lightly infected with mastitis in which, over a period of two years, the milk of individual cows was intensively examined on 18 occasions. Only two animals were clinically affected, but many showed extremely slight infection not discoverable at every test (" cultural latency " of STECK); altogether, of the 29 cows in the herd 22 were found to be infected at one time or another (in 49 quarters).

In the light of events occurring in this herd the control of the disease is discussed in a general way and points where further knowledge is still required are mentioned. One of these points concerns infection in heifers during their first lactation, which apparently may be much more frequent than was formerly believed and may possibly endure from calfhood.

SEELEMANN, M., & SIEMONSEN, K. (1938). Versuche über die " Immunbehandlung " des gelben Galtes mit Mastitex. **[Immunization Against Mastitis with Mastitex].**—*Arch. wiss. prakt. Tierheilk.* **74.** 41-54. 2 figs. [7 refs.]

The authors report on trials with various samples of " mastitex ", a remedy for mastitis of undisclosed composition, prepared by the Landesberger Serumwerke. They found that different batches of the substance varied much in effect and they did not find that its value was proved. Entozon and trypaflavin are much better.
—V. CHLÁDEK (PRAGUE).

EBERTZ, E. G., & LOBITZ, W. C., Jr. (1939). **Induced Localization of Streptococci Through Calcium Gluconate Injections.**—*J. Lab. clin. Med.* **24.** 1250-1255. 5 figs. [14 refs.]

Rabbits were injected intramuscularly with calcium gluconate solution, and intravenously with subculture of a strain of non-haemolytic streptococci from the pulp of an infected tooth. Three to 15 days later, there was appreciable gross hardening of the injected muscles, which were positive for streptococci. The blood was negative and the general health was unaffected.

Three groups of control animals were maintained. Those in the first group received intravenous injections of streptococci alone; they died of generalized infection. Those in the second group were injected with streptococci intramuscularly; caseous abscesses, positive for streptococci, developed at the site of injection [no mention is made of tests on other tissues of these animals]. The third group received intramuscular injections of calcium gluconate; no pathologic effect was produced, and the tissues remained negative for streptococci.

STEWART, D. F. (1939). **Detectable Antibodies in the Sera of Cows Affected with Group-B Streptococci.**—*Aust. vet. J.* **15.** 12-14. 2 tables. [6 refs.]

S. describes tests for agglutinins by the slide method at room temperature and by the tube method at 55°C., as well as for precipitins, against antigens prepared from types of group B streptococci which he has most frequently isolated from cases of streptococcal mastitis in New South Wales. He concluded that the agglutination tests on sera from 31 infected cows were not decisive, and consequently tested five of those showing the highest titre by the type precipitin method. The table of results indicates that three of these gave a definite precipitate with one or more of the four type sera used, and one gave a trace. One serum, presumably chosen for the precipitation test because it agglutinated Types Id and Ic at dilutions of 1:160 and 1:320 respectively, reacted with only one of the four antigens (Type Id), and then with only a trace of precipitation. S. states that there is no reason to consider the reactions recorded as other than true antibody responses to group B streptococci. [One cannot conclude, however, from the evidence presented that the stimulus of udder infection with group B streptococci was responsible for the formation of the antibodies detected in some of the sera].
—T. S. GREGORY.

PINKERTON, H. (1939). **An Outbreak of Anthrax Infection in Minks with Infection of a Ranch Owner.**—*J. Amer. med. Ass.* **112.** 1148-1149.

A report of an investigation into severe losses on one mink farm and slight losses on another, both farms having been supplied with horse flesh by the same knacker. Affected mink died within a few hours after showing convulsions and dysentery. *Bacillus anthracis* was demonstrated bacteriologically and by animal inoculation.

The only lesions in mink dead of anthrax were blood in the large intestine, great enlargement and deep reddening of the spleen, and cerebral congestion.

The owner of one of the mink farms contracted anthrax infection from one of the dead animals through a scratch on the hand.—J. E.

SHARP, D. G. (1939). **The Lethal Action of Short Ultraviolet Rays on Several Common Pathogenic Bacteria.**—*J. Bact.* **37.** 447-460. 12 figs., 1 table. [16 refs.]

The resistance to short ultra-violet rays of ten bacterial species, including *Streptococcus haemolyticus*, *Bacillus anthracis* and *Bacterium coli*, was tested and an estimation made of the energy required to reduce the survival ratio of each to 10%. Beef-extract agar plates were inoculated with diluted 24-hour broth cultures so that 600-1,000 colonies could be obtained. Two separate groups of 12-15 plates of each organism were exposed on different days, in a frame at a distance of 35 inches, to ultra-violet rays from a commercial, low-pressure, glass mercury arc, and the radiant energy was measured by a tantalum-target vacuum photo-electric cell placed below the plates. 90% of a mixture of spores and vegetative forms of *B. anthracis* were killed by a radiant energy of 452 ergs per sq. mm. This mixture was not more than twice as resistant as *Bact. coli*.—R. O. MUIR.

I. HUPBAUER, A., & SKOKOVIĆ, L. (1938). "A.G. vakcina" za jednokratno cijepljenje protiv bedrenice. [**A.G. Single Dose Anthrax Vaccine**].—*Jugoslov. vet. Glasn.* **18.** 135-140. 4 tables. [Numerous refs.] [German summary].

II. LUGOMER, V. (1938). Pokusaji proizvodnje vakcine protiv antraksa po Ramonu. [**Experiments in the Production of Ramon Type Anti-Anthrax Vaccine**].—*Ibid.* 235-239. 2 tables. [Numerous refs.] [German summary].

III. JEZIĆ, J. (1938). Gubi li intrakutana protivbedrenicna vakcinacija na terenu ili na svome rezonu ? [**Is the Intradermal Method of Anti-Anthrax Vaccination Obsolete ?**].—*Ibid.* 373-382. [French summary].

I. An attempt was made to find a substitute for saponin for the localization of the anthrax bacilli at the site of injection of vaccine, saponin having been found too irritant for use on horses. The authors state that a mixture of agar and gelatin was suitable for this purpose. The strain used for the vaccine was pathogenic to rabbits, and was used at a concentration of 10^9 per c.c. A single dose of 0·3 c.c. was given subcutaneously.

II. According to RAMON a safe single-dose vaccine against anthrax may be prepared with organisms suspended in an agar-alum medium, and L. attempted to produce such a vaccine. A strain used for the Pasteur second vaccine was used in a strength of 10^9 organisms per c.c. Three vaccines were prepared ; one was made by adding the bacteria to 0·2% agar, another was made with a 1% alum solution and a third was prepared by mixing 0·2% agar with 1% alum solution and adding the bacilli to this mixture. None of these vaccines gave satisfactory results.

III. J. discusses the various types of anti-anthrax vaccine which have been or are in use. At the State Veterinary Experiment Station at Zagreb, Yugoslavia, he prepared 518,000 doses of glucoside vaccine for subcutaneous injection and over 150,000 doses of a non-glucoside vaccine for intradermal injection. The latter gave satisfactory results, especially in horses.

Favourable reports on the intradermal system of vaccination have been made in France, Morocco, Rumania, Greece, Bulgaria and Turkey, while glucoside vaccines are used chiefly in Italy, Germany and Yugoslavia, but only for cattle,

sheep, and swine, as they cannot be recommended for use on horses or goats. J. considers that the value of intradermal vaccination is well established and that it is to be preferred to the glucoside vaccines. A suitable choice of strains, one for horses and goats, and another for other domestic animals, should open a way to a new intradermal method of immunization in the near future.

—B. Oswald (Križevci).

Egorov, I. A. (1939). O stoĭkosti spor sibirskoĭ yazvy protiv vozdeĭstviya nekotorykh shchelocheĭ i kislot. [**Alkali and Acid Resistance of Anthrax Spores**]. —*Sovyet. Vet.* No. 1. pp. 25-27.

In tests it was found that anthrax spores were killed in 30 minutes by 10% calcium chloride, chloramine or hydrochloric acid, at temperatures between 15°-70°C., and by 10-15% caustic soda, caustic potash or sulphuric acid, at temperatures between 50°-70°C.

E. recommends the use of 10% calcium chloride or caustic soda for the disinfection of anthrax-suspect materials with an alkaline reaction, and of 10% commercial hydrochloric acid for materials with an acid reaction.—E. Martin.

Gambarov, G. S., & Laktionova, A. I. (1939). Issledovanie na sibirskuyu yazvu prob shersti. [**Testing Wool Samples for Anthrax**].—*Sovyet. Vet.* No. 5. pp. 54-55.

In view of the great difficulties encountered in the bacteriological examination of wool owing to its very rich microflora, the authors recommend that wool from anthrax-infected sources should be collected separately and disinfected for anthrax, without troubling to determine whether anthrax spores are present or not.—E. M.

Ferauge, A. (1938). La lutte contre la tuberculose bovine. [**The Control of Bovine Tuberculosis**].—*Ann. Méd. vét.* **83.** 17-33.

F. discusses the relative merits and disadvantages of Bang's and Ostertag's methods for controlling TB., as well as eradication by the destruction of reactors (which, he says, is only feasible in areas in which the incidence of TB. is very low).

About 65% of the herds in Belgium are infected and about 25% of the cattle in them are reactors. F. outlines the history of the control measures which have been used in Belgium [see also *V. B.* **8.** 411.] and concludes that TB. should be dealt with by rapid elimination of all infected animals capable of spreading the infection, and isolation, where possible, of healthy animals. The method of eradication ought to be adapted to the circumstances of the different herds.

Albrecht, A. (1937). Zum Vorkommen der Tuberkelbazillentypen (T. humanus, bovinus, gallinaceus) beim Pferd. [**Types of Tubercle Bacilli in Equine Tuberculosis**].—*Tierärztl. Mitt.* **18.** 589-590.

A. discussed the reports of several workers of the period 1904-1928, during which time the incidence of TB. in horses was found to be one-hundredth of that in cattle. Infection of horses with bovine, human and avian types was recorded. The most usual route of infection was by the alimentary canal ; reference was made to the infection of a young foal by the ingestion of infected cows' milk. In most cases the symptoms included progressive emaciation, a fluctuating temperature and pulse rate, and, in 50% of cases, polyuria and albuminuria. In the early stages the symptoms were easily confused with those of equine infectious anaemia. In advanced cases miliary lesions in the lungs, liver and spleen were observed.

—E. C. Hulse.

FELDMAN, W. H. (1939). **Types of Tubercle Bacilli in Lesions of Garbage-Fed Swine.**—*Amer. J. publ. Hlth.* **29.** 1231-1238. 1 table. [19 refs.] [Author's summary copied *verbatim*].

In order to determine the types of tubercle bacilli in the lesions of tuberculosis in swine fed uncooked garbage, a study was made of material obtained from a large metropolitan area [South Saint Paul, Minn., U.S.A.—Ed.] The total number of garbage-fed hogs examined at post-mortem examination was 264. Lesions of tuberculosis were established by the meat inspectors in 75, or 28·4 per cent. All lesions studied were those involving lymph nodes. By culture procedures and the inoculation of guinea pigs tubercle bacilli were demonstrated in 47. Subcultures were obtained of each of the 47 strains and the bacillary type of the respective strains was determined by tests for pathogenicity. Guinea pigs and rabbits were used. Thirty-five, or 74·5 per cent. of the strains were tubercle bacilli of the avian type, and 12, or 25·5 per cent., were tubercle bacilli of the human type.

GREAT BRITAIN. (1939). **Ministry of Health Report of the Committee of Inquiry into the Anti-Tuberculosis Service in Wales and Monmouthshire.** pp. 291. 26 tables, 1 chart. London: H.M. Stat. Off. [8vo] [4s. 6d.]

MILK AND MEAT PRODUCTION, AND SUPERVISION.—It is pointed out that the support given to the Government Departments—the Ministry of Health, the Board of Education and the Ministry of Agriculture—in their attempts to improve the consumption and quality of milk has varied from one local authority to another. Evidence received indicated that milk may be regarded as reasonably safe if (a) the cow passes the tuberculin test, (b) in the case of a reactor, rigid precautions are taken to ensure that the milk is not infective, and (c) the milk from a non-reactor is examined bacteriologically and by animal inoculation. The committee considered that efficient pasteurization is desirable until clean milk for human consumption is obtainable. It is pointed out that universal pasteurization is impracticable, and that measures for the elimination of diseased cows should, therefore, be continued and extended.

A table shows the number of attested, licensed "tuberculin tested", and accredited herds in each county in Wales.

Regarding the Milk and Dairies Acts and Orders, differences in standards of enforcement are mentioned; this applies to requirements as to structure and cleanliness of cowsheds and dairies, methods of milking, protection against contamination and taking of samples. The committee consider that under the present legislation there are too many classes of milk.

Attention is drawn to the lack of uniformity between local authorities with regard to meat inspection. The proposal for central abattoirs was considered and it was felt that there should be a gradual change from the present state of numerous private abattoirs.—J. C. WALLACE.

HERMANSSON, K. A. (1939). Föreligger risk för besiktningsveterinär att under sitt på offenligt slakthus eller kontrollslakteri bliva infekterad med tuberkelbakterier? [**Occupational Tuberculosis in Meat Inspectors**].—*Skand. VetTidskr.* **29.** 926-933. [Abst. from author's English summary].

Of 15 g. pigs inoculated with washing water in which a veterinary meat inspector had washed his hands after examining meat of tuberculous cattle, 11 developed TB. The disease was also produced in three g. pigs inoculated with washing water in which the towels used by the inspecting veterinary surgeon had

been washed. TB. developed in three g. pigs inoculated with the water in which slaughterers had washed their hands after their work.

H. emphasizes that these experiments have shown that work with meat and organs of tuberculous animals is attended with considerable risk, both for those engaged in the slaughtering and for the inspectorate staff.

FELDMAN, W. H., & BAGGENSTOSS, A. H. (1939). **The Occurrence of Virulent Tubercle Bacilli in Presumably Non-Tuberculous Lung Tissue.**—*Amer. J. Path.* **15.** 501-515. 1 text fig., 1 table. [14 refs.]

Material from the lungs and the associated lymph nodes of 51 persons, who, with one exception, had died from causes other than tuberculosis, was inoculated into g. pigs to determine the presence of tubercle bacilli in presumably non-tuberculous tissue. In the case of 12 of the cadavers no gross or microscopic evidence of tubercle bacilli had been found ; in 38 there were lesions of healed or latent tuberculosis, while in the remaining one the cause of death had been tuberculous enteritis. Positive results were obtained in only three instances and the authors conclude that virulent tubercle bacilli are seldom present in the apparently non-tuberculous lungs of individuals dying from causes other than tuberculosis.

—J. R. LAWSON.

PIASECKA-ZEYLAND, E., & ZEYLAND, J. (1940). **I. Influence of the Size of the Infecting Dose on the Course of Tuberculosis. II. Influence of the Virulence of Infecting Bacilli on the Course of Tuberculosis.**—*J. Path. Bact.* **50.** 153-160. 3 figs. on 1 plate, 2 tables. [12 refs.]

I. Experiments were performed on groups of g. pigs of the same weight and age to determine the mean survival time after the inoculation of varying doses of tubercle bacilli. A tenfold difference in the infecting dose produced no appreciable difference in the course of infection and the time of survival. A hundredfold difference showed a marked but uncertain influence. A thousandfold difference with a human strain resulted in a mean survival time of 88 days with a large infecting dose (10^{-1} mg.) and 159 days with the small dose ; in this experiment the difference was clearly marked. A ten-thousandfold difference with a bovine strain also produced significant differences in the survival times (147 days with 10^{-2} mg. and 234 days with 10^{-6} mg.). The authors conclude that differences in the size of the infecting dose exert an influence on the course of experimental tuberculosis only when they are very great.

II. Groups of g. pigs of the same weight and age were inoculated with strains of human and bovine tubercle bacilli isolated from different human subjects. In two out of five experiments a marked difference was observed in the survival times of g. pigs inoculated with the same weight of virulent culture. G. pigs inoculated with a bovine strain isolated from a case of lupus in a human subject showed a mean survival time of 120 days, whereas g. pigs inoculated with a bovine strain from chronic disseminated miliary TB. died in 96 days.

In a second experiment one group of g. pigs was inoculated with a human strain derived from a healed lung lesion ; the mean survival time was 291 days. A second group received a similar dose of culture isolated from a case of disseminated miliary TB. following a primary lung lesion ; the mean survival time was 183 days. The authors conclude that there is no correlation between the course of the disease in the human subject and the virulence for g. pigs of the organisms isolated.

—E. C. HULSE.

DEBIESSE, J. (1939). Contribution physico-chimique à l'étude du métabolisme du bacille tuberculeux BCG. [**Physico-Chemical Study of BCG Metabolism.**]—*Arch. Inst. Pasteur Tunis.* **28.** 136-220. 16 text figs., 1 fig. on 1 plate, 15 tables. [Numerous refs.]

This article deals with studies made on the growth of BCG on Sauton's medium, partly by chemical methods and partly by the use of the spectrograph.

The first part is devoted to a theoretical, mathematical treatment of the subject of bacterial growth. The second part deals with the chemical studies upon the growth of BCG from the standpoints of gaseous exchange, pH, SO_4 and PO_4 ions, citric acid, glycerol, total N and asparagine fractions. Various products appearing in the medium as a result of the growth of the organism were investigated, in particular various acids and lactose.

The third part is devoted to the chemical interpretation of the various absorption spectra obtained at different stages of growth, especially in the correlation of the chemical changes in the medium with the spectral changes. D. suggests a more extensive use of the spectrograph in correlating chemical changes taking place in the growth of other strains of TB.; for fuller details the original should be consulted.

[The article as a whole is very discursive and many of the chemical methods employed are cumbersome and in some cases out of date. There is no reference to the vast amount of work that has been done in the United States on chemical studies on the growth of TB. on synthetic media. Further, D. has failed to make a clear case for the use of spectrographic studies in work of this type, since at present they are entirely subservient to the more established methods of chemical analysis, especially in dealing with a medium which becomes much more complex as bacterial growth proceeds].—ALFRED EDEN.

FELDMAN, W. H. (1939). **The Pathogenicity of BCG after Prolonged Cultivation on Glycerinated Egg Medium.**—*Tubercle, Lond.* **20.** 253-262. 7 figs., 3 tables. [7 refs.]

After BCG had been subcultured on glycerinated egg-yolk medium over a period of six years for 59 generations, 12 g. pigs and 18 rabbits were inoculated with 2 mg. doses of bacilli each, subcutaneously, intraperitoneally or intravenously. After 15 months 3 g. pigs and 13 rabbits still survived and the experiment was terminated. In no case was a progressive tuberculous infection observed. Intraperitoneal inoculation produced a mild tuberculosis-like disease in g. pigs, which could not be reproduced by inoculation into other g. pigs. In some rabbits, epithelioid tubercles were found in the parenchyma of the lungs, spleen or liver; these were non-progressive and of an atrophic nature. Prolonged cultivation of BCG on glycerinated egg medium did not increase its virulence for rabbits or g. pigs.—E. C. HULSE.

TOPACIO, T. (1938). **Caseous Lymphadenitis of Goats.**—*Philipp. J. anim. Indust.* **5.** 457-464. 2 figs. on 1 plate, 1 table. [2 refs.]

T. describes cases of caseous lymphadenitis, seven in adult goats and four in kids. The symptoms shown varied from enlargement of the prescapular or precrural lymph nodes to complete emaciation and cachexia. The lesions were similar to those seen in sheep. Inoculation of blood into laboratory animals and into a goat gave negative results, but emulsions made from lymph nodes and lung material proved fatal when inoculated into three goats, producing typical lesions. From closed nodules, cultures were obtained which had all the staining, morphological and cultural characteristics of *Corynebacterium ovis*. Pathogenicity for

laboratory animals was proved. T. suggests that imported goats may be more susceptible to the disease than the native breeds.—J. R. Lawson.

Zochowski, P., Rogiński, Z., & Teklińska, M. (1937). Próby uodparniania świń yatrenizowaną serowakcyną i yatrenizowaną szczepionką różycową. **[Immunization against Swine Erysipelas by Sero-Vaccination and Yatren-Vaccine]**.—*Pam. pańs. Inst. nauk. Gosp. Wiej. Puławy.* **1.** 76-84. 4 tables. [8 refs.] [French summary]. [Suppl. to *Wiad. weteryn.* **16**].

The authors experimented on mice and pigs. For the first vaccine, using mice, 0·2 c.c. of virulent culture was used, to which yatren (a commercial product, presumably of protein, used for non-specific stimulation therapy) was added in a proportion of 5:1,000 ; a sero-vaccine was prepared from S.E. antiserum and yatren vaccine in equal proportions. After 13 days a second injection was given, using 0·5 c.c. of vaccine and sero-vaccine, and 12 days later all the mice were injected subcutaneously with 0·01 c.c. of *Erysipelothrix rhusiopathiae* culture. The control mice died, but the six inoculated mice did not become infected.

In the second experiment 19 pigs were used, five of which were injected twice with 20-30 c.c. of yatren sero-vaccine only, while the remaining 14 were given one injection of 20-30 c.c. of yatren sero-vaccine and one of 10-15 c.c. of yatren vaccine. After intervals ranging from 21 to 72 days, they were injected with 1 c.c. of *E.r.* culture. Five pigs, used as controls, all contracted S.E., while of the 19 hyper-immunized pigs only one became infected. The authors conclude that the sero-vaccine confers some measure of immunity, but they state that these experiments are only preliminary.

Miller, D. H. (1939). **The Transmission of Tularaemia by the Fin Prick of a Catfish.**—*Milit. Surg.* **84.** 23-29. [Numerous refs.]

An account of a case in a human being. The patient had his finger pricked when dressing a mud catfish freshly caught in Kansas, U.S.A. Three neighbours also pricked their fingers when dressing some of the same catch of fish, and contracted the infection. The patient stated that he had seen rabbits with " rabbit fever " fall into the river and drown, and that there had been numerous rabbit carcasses in the river.

Platt, A. E. (1939). **A Serological Study of *Haemophilus influenzae*. 2. Two Serologically Active Protein Fractions Isolated from Pfeiffer's Bacillus.**—*Aust. J. exp. Biol. med. Sci.* **17.** 19-24. 2 tables. [11 refs.]

The earliest attempts at classifying *H. influenzae* revealed a heterogeneity of antigenic structure within the species, but some of the more recent work has suggested the existence of a common antigenic factor. P. first isolated a protein fraction which showed a high degree of serological specificity for particular strains. Later he succeeded in isolating an extremely labile protein fraction which reacted with antisera for most strains of *H. influenzae* and at least one strain of *H. canis*. This latter fraction is probably situated superficially on the bacterial cells, whereas the specific component is situated deeply within the organism. The labile antigen was obtained merely by washing the bacteria in saline at pH 7·1. It was inactivated by storage in the ice-chest in from 7-10 days or by the briefest exposure to pH values above 7·2 or below 6·4. It was very toxic for mice on intraperitoneal or intravenous inoculation, causing death with haemorrhages and marked congestion of the lungs and pleura.—W. I. B. Beveridge.

BIERBRAUER, M. (1939). Ueber ein neues Anreicherungsverfahren bei Kotuntersuchungen auf Enteritiskeime unter Verzicht auf den direkten Ausstrich. [**A New Faecal Enrichment Method for Salmonella**].—*Berl. Münch. tierärztl. Wschr.* July 21st. 453-457. 5 tables. [6 refs.]

B. has investigated several methods of isolating salmonella bacteria from faeces and compared the direct plating of faeces with primary enrichment methods, whereby a small quantity of faeces is placed in a fluid medium before plating. After a trial of several well-known methods he used a modification of his own based on that of Hoder. The enrichment fluid has the following composition :- 870 c.c. Müller's tetrathionate broth ; 100 c.c. of bovine bile ; 16 c.c. of a 1:250 watery solution of malachite green, and 2 c.c. of a 1:200 watery solution of brilliant green. These are mixed together and placed in an incubator for three hours after which a further 8 c.c. of the malachite green solution and 3 c.c. of the brilliant green solution are added.

A quantity of faeces is placed in some of the above fluid at 37°C. for 24 hours and then plated on to a differential medium. Brilliant-green : phenol-red agar is considered to be the most satisfactory for the latter purpose.—R. LOVELL.

DUMARESQ, J. A. (1938). **Comparative Studies of *Salmonella pullorum* and *Salmonella gallinarum*.**—*Aust. J. exp. Biol. med. Sci.* **16.** 361-369. 1 table. [16 refs.]

D. briefly reviews the literature on the age of fowls in relation to infection with *S. pullorum* and *S. gallinarum*, and on the methods used for differentiating between the organisms. He stresses the importance of clear differentiation on culture media and draws attention to essential details of technique which have often been neglected. D. then describes his own work in which he isolated *S. gallinarum* from a septicaemic disease of adult fowls in Tasmania, this being the first record of its isolation in Australia. In a comparative study of four strains of *S. gallinarum* and eight strains of *S. pullorum*, he found that maltose, dulcite, sodium mucate and sodium potassium tartrate were attacked by the former but not by the latter. Litmus milk and bromthymol-blue agar were also useful differential media. D. was unable to detect any serological differences in the cultures examined nor could he detect any Vi antigen.—T. S. GREGORY.

—. (1938). **Eighteenth Annual Report on Eradication of Pullorum Disease in Massachusetts.**—*Control Ser. Mass. agric. Exp. Sta.* No. 93. pp. 11. 7 tables.

It is stated that during the course of the eighteen-year testing period, a large number of pullorum-clean flocks were established, and it is hoped that within a reasonable time pullorum disease will cease to be a serious economic problem. It is stressed that, to understand the true status of a flock, annual testing of all the birds in the flock, including chickens, is essential. The necessary control measures to be adopted by the poultry breeders are discussed.

The total number of tests during that period was 502,341, including 216 tests for other salmonella infections. The average percentage of positive tests for the state was 0·17. It appears that there were reactors among turkeys and the presence of *Salmonella pullorum* infection, in the reacting adult turkeys, was confirmed by necropsy and bacteriological examinations.

The Massachusetts Department of Agriculture recognizes two official grades for pullorum disease, namely, " pullorum passed " and " pullorum clean ".

—S. G. IYER.

MALTA. (1939). **Second Progress Report of the Brucella Melitensis Research Station.** [POLDING, J.] pp. 62. 18 tables, 7 charts, 1 appendix. [11 refs.] Valetta, Malta: Govt. Printer; London: Crown Agents for the Colonies. [fcp] [2s. 6d.] [See also *V. B.* **7.** 579].

The report, which describes work performed during the period May 1937 to Sept. 1938, is divided into four sections, *viz*, cultural studies and technical methods, the course of *Br. melitensis* infection in the goat, transmission of infection, and immunity experiments. Tryptose agar made by Difco Laboratories has been found superior to other solid media for the growth of *Br. melitensis*. For isolation purposes gentian violet is added. The technique used for isolation from milk and vaginal secretions and methods of estimating S-R change are described. For milk tests Huddleson's quick test was used.

The effects of infection by subcutaneous inoculation and contact were studied. Of 32 goats exposed to contact infection, five gave no serum response. The earliest reaction occurred within nine days of exposure and the latest, 100 days. In goats artificially infected a bacteraemia occurs about the seventh day after inoculation and may last for a month or more. The experiments indicated that these goats became infectious as early as the end of the first week after inoculation. Non-pregnant goats infected by contact show little serum response and this lasts only a short period.

The most apparent clinical symptom of *Br. melitensis* infection in the goat is abortion. In acute infection, pyrexia occurs and the animal rapidly loses condition, with drooping head and staring coat, and in some cases there is slight diarrhoea.

Whilst the majority of goats cease to be dangerous within five months of the termination of the pregnancy during which they were infected, localization may occur for perhaps long periods. Kids appear to be highly resistant for at least two months after birth.

Immunity experiments were carried out with a dead *melitensis* vaccine prepared from broth culture filtrates and with a live *abortus* vaccine. Vaccines were tested on goats and the agglutination reactions charted. Allergic reactions in rabbits were also used in potency tests. 24 goats were used in the dead vaccine experiment, as well as 9 "donor" (artificially infected) goats and 21 controls. The vaccinated goats received 0·5 c.c. intradermally on the udder. The donor goats were infected subcutaneously with 0·5 c.c. of a smooth *Br. melitensis* culture when well advanced in pregnancy. All aborted except one which was not pregnant and one which kidded four days after inoculation. Foetuses and membranes were left *in situ* to distribute infection. All goats were regularly tested and confirmation of infection sought by culture from the foetus and membranes, and routine plating of milk and vaginal secretions for one month after kidding. A further group of goats which had been used for testing vaccine were also added. In 9 donors, infection was confirmed in all; in the controls all except one, and in the vaccinated goats 4 out of 14 were negative. In the last group of vaccine-test goats 12 out of 14 were negative, but this group consisted of older goats and it is remarked that no controls of the same type were included.

In the live-vaccine experiment 8 kids of $4\frac{1}{2}$ months and 16 of $5\frac{1}{2}$ months were inoculated subcutaneously with approximately 1,250 million *Br. abortus* organisms. All responded with a serum reaction of an aggregate titre of 1:1,280, and the titres then fell rapidly. 12 of these kids were exposed to infection when sexually mature whilst 12 were left as controls. The results showed that no residual immunity against *melitensis* infection was conferred by the kidhood attack of *abortus* infection.

In conclusion, the Maltese goat is stated to be highly susceptible to *Br. meli-*

tensis. It is pointed out that for brucella investigation goats have many advantages as experimental animals. The experiments carried out were of a preliminary nature and should be continued. Field inoculation might be combined with breed improvement by using only selected male goats at government controlled stations. —S. J. Gilbert.

Lisbonne, M., Roman, G., & Renoux, G. (1939). Vaccination de la brebis, contre l'infection brucellique. [**Vaccination of Sheep against Brucella Infection**].—*Bull. Acad. vét. Fr.* **12.** 273-276.

Following on successful vaccination experiments on g. pigs against brucella infection, the authors carried out similar experiments on sheep. Nine ewes, free from brucella infection, were vaccinated, before service, with a strain of *Br. abortus* which was known to be avirulent for various species of animals, and they received at 20-day intervals three intradermal injections of an antigenic glyco-lipid extract of *Br. melitensis*. One month after this treatment ended a test dose of a virulent culture of *Br. melitensis* was inoculated by perimammary scarification. Each animal was then submitted to a weekly sero- and bacteriological examination. These proved negative. All the ewes lambed at their normal gestation periods, and cultures made from the vaginal mucosa and from the milk proved negative for brucella organisms as also did P.M. examinations.

Three control ewes were used to demonstrate the innocuousness of the vaccine and two control ewes the efficacy of the test dose. The former group remained unaffected, while in the latter, one ewe aborted and the other lambed to time. From these two animals *Br. melitensis* was isolated from the blood, from the vaginal mucosa and from the milk. The authors claim that this method affords complete protection against brucella infection and hope to carry out experiments on similar lines on cattle.—J. R. Lawson.

Bull, L. B. (1939). L'entéro-toxémie du mouton en Australie. [**Enterotoxaemia in Sheep in Australia**].—*Bull. Off. internat. Epiz.* **18.** 253-267. [Num. refs.]

B. reviews the progress of research on enterotoxaemia in sheep in Australia and New Zealand. The varying age incidence in different localities is discussed. It is suggested that the presence in the ileum of large quantities of semi-digested material, following intake of abundant or excessive food, provides favourable conditions for the development of *Clostridium welchii* Type D, if this organism has escaped destruction in the stomach. Prophylaxis by use of formol toxoid has been widely practised. In areas where pulpy kidney disease occurs in very young lambs, vaccination is impracticable and antiserum is too expensive. In such districts the method of ewe vaccination has been developed, with some success.

Recent unpublished work by Oxer has suggested that lambs from vaccinated mothers do not develop a satisfactory degree of immunity following toxoid vaccination. Lambs generally have not proved good subjects for vaccination. Better results have been obtained with alum-toxoid than with formol toxoid, though local reactions with this agent have been troublesome.—H. E. Harbour.

McKenney, F. D. (1938). **Malignant Edema in Deer.**—*Trans. 3rd N. Amer. Wildlife Conf., 1938.* pp. 886-889. Washington: American Wildlife Institute.

During summer and autumn the death of a number of deer in a national park was investigated. About 20 carcasses were found within a radius of a few miles. A number of deer were isolated, three of which became ill. One showed acute pyrexia, peeling of the nose, salivation, roughness of the coat, anorexia, and

general distress. Another died within 48 hours of the first appearance of the symptoms.

Autopsy revealed small erosions on the mucous membrane of the first stomach, and in the intestine. In one case, there was slight subcutaneous oedema of the shoulders and quarters. Cultural and animal-inoculation examinations of the visceral organs were made in routine manner. After 24 hours, although all cultures were negative, all the experimental animals had died, and *Clostridium septique* was isolated in pure anaerobic culture.

The author suggests from this experiment that malignant oedema may be relatively common, and he emphasizes the need for burying the carcasses of animals in order to control infection.—D. D. Ogilvie.

I. Bøe, J., Hartmann, O., & Thjøtta, T. (1939). **A Serological Study of Aspergillus Fumigatus.**—*Acta path. microbiol. scand.* **16.** 178-186. 3 tables. [9 refs.] [In English].

II. Henrici, A. T. (1939). **An Endotoxin from** *Aspergillus fumigatus.*—*J. Immunol.* **36.** 319-338. [Numerous refs.]

I. The difficulty of demonstrating antibodies in serological work with this fungus is mentioned. Ten strains of *A.f.* isolated from the lungs of dead grouse, were studied. The fungus was pathogenic for rabbits, g. pigs and mice. The lesions in the g. pig are described. From the nature of the lesions, the action of a toxin was suspected, but could not be proved experimentally. Attempts to raise the virulence by serial passage through g. pigs were unsuccessful.

Methods of preparing antigen, and immunization of rabbits are described. Complement-fixation tests gave better results than agglutination and precipitation reactions, in the demonstration of specific antibody in the sera of inoculated rabbits. No serological difference between the strains from different sources was found by the complement-fixation test. Spores and mycelium were shown to have identical antigenic values. The immunizing effect of *A.f.* is quite high if a large quantity of a suitable antigen is used.

II. H. had previously shown that *A.f.* produces a definite endotoxin which is antigenic. The active immunity produced in rabbits following toxin inoculation has been passively transferred to g. pigs and mice. The toxin is thermolabile and is haemolytic. It produces effects on rabbits, g. pigs, mice and chickens. The serum of animals treated with the endotoxin neutralizes the haemolytic property in tube tests.

The phenomenon of supersensitivity in rabbits with *A.f.* infection, following endermal injection of toxin, was observed. This paper is, in short, a study of allergy and immunity in experimental aspergillosis.—S. G. Iyer.

DISEASES CAUSED BY PROTOZOAN PARASITES

Neitz, W. O., & du Toit, P. J. (1938). **Tick-Borne Diseases.**—*J. S. Afr. vet. med. Ass.* **9.** 85-124. 3 tables. [Numerous refs.]

This paper was written to enumerate briefly the various ticks concerned in the transmission of animal diseases. For the sake of completeness vectors other than ticks are included in the tables. The various forms of spirochaetosis, piroplasmosis, babesiasis, nuttalliasis, theileriasis, anaplasmosis, eperythrozoonosis and rickettsiasis are dealt with, and in conclusion the transmission of some virus diseases and tularaemia is mentioned. In the case of the life-cycle of *Theileria parva* in *Rhipicephalus appendiculatus*, Reichenow [*V. B.* **6.** 584.] disagreed with

the findings of Cowdry [*V. B.* **3.** 612.], pointing out that he was unable to find the male and female elements of the parasite in the gut and that certain structures in the salivary glands of the ticks were symbionts.

A comprehensive survey of the rickettsiases and their methods of transmission is given. It has recently been found in South Africa that *Haemaphysalis leachi* is a vector of tick-bite fever and nymphae of *Hyalomma aegyptium* var. *impressum* collected from a hare have produced symptoms similar to those of tick-bite fever when allowed to feed on g. pigs.

There are three tables at the end of the article which should prove very valuable to the veterinarian. In the first the disease, animals affected, cause, country in which found and transmitter are given, with the stage at which transmission occurs. In the second the genus and species of the tick are given with the parasite and host.

In the last table are given the diseases with the parasite causing them, and the incubation period by artificial and natural transmission.—E. M. Robinson.

Gavulov, W., & Laurencin, S. (1938). Application d'une méthode de culture de tissus à l'étude de protozoaires. [**Study of Protozoa by Tissue Culture**]. —*Ann. Soc. belge Méd. trop.* **18.** 41-56. 13 plates. [13 refs.]

In attempting the cultivation of *Leishmania* in tissue cultures, the authors found that the parasites inhibit the multiplication of fowl fibroblasts in fowl serum, and that hamster tissue shows a very feeble increase in fowl serum, but that hamster plasma with embryonic extract forms a very good medium for *Leishmania*. Intracellular forms of *Leishmania* were successfully cultivated in a medium containing hamster plasma, hamster embryonic extract and cells of the liver, spleen or kidney of a hamster. Cultures could be obtained, either by using the organs of infected animals, or by using healthy organs and inoculating the medium with the flagellate cultural forms.

A special room was used for making the cultures and strict aseptic precautions were taken. A small piece of organ was placed on a mica cover-slip, a drop of mixed plasma and embryonic extract was added, and the whole covered with a hollow slide, vaseline being used to obtain adherence of the slide to the cover-slip. When the plasma had coagulated the preparations were turned over, sealed with paraffin wax, and incubated at 37°C. In these cultures there was a multiplication of the organ cells, the monocytes, and lymphocytes. The leishmania could be seen to increase in size, elongate and leave the cells, being taken up by monocytes. It is claimed that this cell-culture method allows of the microscopic observation of the development cycle of protozoa.—U. F. Richardson.

Kulakov, K. A. (1935). K voprosu ob epidemicheskom znachenii sobach'ego leishmanioza. [**Epidemic Significance of Canine Leishmaniasis**]. —*Bull. Uzbek. nauchn.-issled. vet. Inst., Tashkent.* No. 1-2. p. 34.

K. found that canine leishmaniasis in Tashkent (an epidemic centre of human kala-azar) differed considerably from canine leishmaniasis in Ashkhabad (an epidemic centre of human oriental sore).

The strict localization of the two forms of human leishmaniasis, despite extensive opportunities of mutual direct transmission, led K. to surmise that the explanation for the dissimilarity of the manifestations might lie not so much in the difference between the causative organisms as in the effect of various external factors (*e.g.* climate, water, atmospheric humidity) on the biology of both the causative agent and the host.

K. states that hamsters which have displaced other rodents as pests in the houses of Ashkhabad, and geckos (*Gymnodactylus* sp.) which are of very frequent occurrence in Turkmenia, probably act as parasite reservoirs in addition to dogs.
—E. Martin.

Soldini, M. (1939). Procédé pratique et rapide de diagnostic expérimental de la dourine. [**Rapid Method for the Diagnosis of Dourine**].—*Bull. Soc. Path. exot.* **32.** 334-341.

0·5 c.c. of scrotal oedema fluid or 1 c.c. of citrated blood from a horse with *Tryp. equiperdum* infection, injected into the testicles of a rabbit, produces orchitis with extensive oedema in 4-5 days, and rapid multiplication of the trypanosomes in this site. Parasites are easily detectable in the scrotal oedema but do not appear in the circulating blood. Occasionally conjunctivitis or involvement of the urinary tract and death may occur. S. considers that this is a simple, rapid, and sure method of diagnosis.—M. L. Bingham.

Biocca, E. (1939). Essais de vaccination contre le *T. Brucei* chez les cobayes moyennant une bouillie d'embryon de poulet infecté, conservée en glacière. [**Vaccination against *Trypanosoma brucei* Infection in G. Pigs by Means of Infected Chick Embryo Preserved on Ice**].—*Boll. Sez. ital. Soc. int. Microbiol.* **11.** 136-137. [In French].

Trypanosomes in chick-embryo blood kept on ice lost their infectivity after two days, but remained motile for more than 15 days; such material after cold storage for three to five days was found to produce some immunity when injected into g. pigs.

G. pigs injected (intraperit.) with 1 c.c. of ice-stored material prepared from an infected chick embryo, lived for an average of 36 days after receiving an infective dose, whereas untreated g. pigs died on an average 10 days after infection.
—M. L. Bingham.

Christophers, R., & Fulton, J. D. (1938). **Respiratory Metabolism of *Trypanosoma rhodesiense* and *Plasmodium knowlesi* with Observations on the Inhibitive Effect of Various Compounds on the O_2 Uptake by these Organisms.**—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 2. pp. 509-514. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In English].

The main respiratory process of trypanosomes appears to be the action of dehydrogenase converting glucose to acid products, which under aerobic conditions absorb O_2. Malaria parasites take up oxygen, as is shown by the darkening of a mass of centrifuged red cells if they are left standing in narrow tubes, but this does not appear to be related in any way to the presence or absence of glucose. Whether the inhibition of O_2 uptake by drugs is due to lethal effect alone or to inhibition of respiratory action, it appears to have some correlation with therapeutic action. The complex organic bases, quinine, atebrin, plasmoquin, vuzin and undecane diamidine, are all in varying degrees effective inhibitors against both malaria parasites and trypanosomes, the action appearing due to their being particular types of organic bases. Their inhibitive power would seem to be linked with the fact that the organic ion is weak. Whilst trivalent arsenic compounds are powerfully trypanocidal and act to some extent on malaria, pentavalent compounds are entirely ineffective in inhibitive experiments; as the latter are arsonium compounds, they form salts which dissociate as strong ions, comparable for example with sodium chloride.—U. F. Richardson.

Schaaf, J., & Schmitt, H. (1939). Ueber die Morphologie von Trichomonas columbae. [**Morphology of** *Trichomonas columbae*].—*Zbl. Bakt. I.* (*Orig.*). **139.** 126-129. 6 figs. [8 refs.]

Observations were made on 100 *Trichomonas columbae* grown on Boeck and Drbohlav's egg-serum medium. When stained with Giemsa the organisms were 8·5-14μ long (average 11·4μ) and 5·4-10·8μ wide (average 7·6μ). These measurements are somewhat bigger than those given by Nieschulz and Bos [*V. B.* **6.** 705]. Trichomonads from blood examined after vital staining were frequently spear-shaped, while those from cultures were seen by vital staining to be round or oval, and bigger.

The flagella and undulating membrane were found to be as described by Nieschulz and Bos, but contrary to the observations of those authors the axial rods were found to invade the whole organism and sometimes to be divided into several threads.

Multiplication of trichomonads was found to be by binary as well as by multiple division.

Redmond, W. B. (1939). **The Cross-Immune Relationship of various Strains of** *Plasmodium cathemerium* **and** *P. relictum*.—*J. infect. Dis.* **64.** 273-287. 1 fig., 8 tables. [13 refs.]

This is a study on the immunology of two strains each of *Pl.c.* and *Pl.r.* Detailed experimental data on cross infection and cross immunity are given and discussed. R. considers that there exists a correlation between the virulence of the strains and the relative immunity developed by the host to them. It has been found that the more virulent strains cause complete immunity to cross infections with any less virulent strain ; on the other hand, the immunity conferred by less virulent strains is not wholly adequate to resist infections with strains of relatively greater virulence. Multiple superinfection with a strain of low virulence produces effective immunity to infection by a strain of relatively higher virulence.

Female canaries were used as the vertebrate host in these experiments.

—S. G. Iyer.

Proske, H. O., & Watson, R. B. (1939). **The Protein Tyrosin Reaction. A Biochemical Diagnostic Test for Malaria.**—*Publ. Hlth Rep., Wash.* **54.** 158-172. 2 tables. [Numerous refs.]

As a result of the work of Henry, Chorine and others it has been shown that in malaria a disequilibrium of the serum proteins occurs, characterized by an increase of the euglobulin fraction, but tests devised to detect this alteration have required special apparatus which is not available at most laboratories. The authors describe a test based on the chromogenic property of proteins in the presence of a phenol reagent which can be measured quantitatively against the colour produced by pure tyrosin with the same reagent. The euglobulin is precipitated from the serum under test by the addition of 13·5% sodium sulphate. The precipitate is redissolved in distilled water to which sodium hydroxide is added, and the colour given when the phenol reagent is added is compared with the colours given by solution of pure tyrosin diluted to strengths of from 100-10% of a solution of 200 mg. per 1,000 ml. Readings of 50-80% are considered normal, those of 80-100% are considered suspect for malaria, and those of 105%, or over, as positive for malaria. 97·4% positive readings were given in a limited number of known malarial cases, against 81·9% of the same cases found positive by the

examination of blood films taken at the time of testing. The reaction becomes negative under quinine and atebrin treatment.

It is suggested that the reaction may be of value as a test for other conditions in which protein disequilibrium occurs.—U. F. RICHARDSON.

DSCHUNKOWSKY, E. (1938). **Description of the Schizogony-Cycle of an Endoglobular Parasite in the Red Blood Corpuscles of Cattle in View of Creation of a New Family in the Sub-Order Piroplasmidea.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 800-807. 2 figs. [In English: French, German and Italian summaries].

D. describes the detection of piroplasm-like parasites in the blood of cattle in Transcaucasia. The pathogenic importance of the organisms could not be ascertained as they were always associated with rinderpest. They were most numerously present in the kidney blood, and in this position as many as 40% of the red blood corpuscles might be invaded. The organisms occurred as rings in the red blood corpuscles, but the chromatin might take a peripheral position, and break up into 2, 4, 7, or 9 granules.

These bodies are described as schizonts and are said to break up into anaplasma-like merozoites. An extracorpuscular form was encountered with dark blue cytoplasm, and the chromatin localized on the periphery as a point or a bow-shaped thickening of the edge. It is thought that these forms are quite distinct from the plasma bodies of *Theileria*. In view of the schizogony occurring in the red corpuscles, D. considers that these organisms cannot be included in the family *Babesiidae* and he proposes to create a new family, the *Luhsidae*. [These organisms may represent a mixed infection of piroplasms or possibly degeneration of blood corpuscles, and further information is required before their identity can be accepted].—U. F. RICHARDSON.

LAVRENT'EV, P. A. (1935). Morfologiya vozbuditeleĭ piroplazmozov krupnogo rogatogo skota v UzSSR. [**Morphology of the Causative Agents of Piroplasmosis in Cattle in the U.S.S.R.**]—*Bull. Uzbek. nauchn.-issled. vet. Inst., Tashkent.* No. 4. pp. 20-28. 2 figs., 5 tables. [10 refs.]

Organisms causing piroplasmoses and anaplasmosis of cattle in Uzbekistan, *i.e. Babesia bigemina, Françaiella* [*Babesia*] *colchica, F.* [*B.*] *caucasica, Theileria annulata, Th. mutans* and *Anaplasma marginale* were studied and their morphology, localization in the body of the host, proportional participation in epizootics during 1933 and 1934 and reaction to chemical agents described.—E. MARTIN.

REICHENOW, E. (1938). Ueber die Entwicklung des Erregers des Küstenfiebers der Rinder und die Pathogenese dieser Krankheit. [**The Development and Pathogenicity of the Causal Organism of East Coast Fever**].—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 681-686. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German: Discussion pp. 686-687 in French and German].

The author is of the opinion that there is no development of *Theileria parva* in the gut of ticks, but that the surviving organisms pass directly to the salivary glands where they commence to develop when the tick has moulted and attached itself to a new host. They first multiply by binary fission amongst the drops of secretion in the affected cells. Later the cell secretion disappears and the parasites are seen clustered around the cavity in the form of a ring. This is the picture which COWDRY and HAM described as the production of sporozoites on the surface of

the sporoblast residual body. The nuclear chromatin which appears spongy during multiplication becomes compact, so that the nucleus now appears to be smaller. Finally, the host cell ruptures and the *Theileria* enters the lumen of the salivary ducts.

R. found that in affected areas 100% of *Rhipicephalus appendiculatus* carried infection. He points out that in some areas around Lake Victoria, East Coast fever is absent, and ascribes this to the absence of *Rh. appendiculatus*. It is true that *Th. parva* can develop experimentally in other ticks such as *Rh. evertsi*, but these do not prove suitable vectors as they do not drop off from their host between the larval and nymphal stages, and if they attach to an animal infected with E.C.F. the animal may die before development of the tick is completed.

As regards development in the vertebrate, the *Theileria* enter lymphocytes and are only able to develop in the cells. When active multiplication is taking place the nuclei are loose and spongy, but when multiplication ceases they become compact. This is offered as an explanation of the difference between blue bodies with large and those with small chromatin granules, a phenomenon which has been explained by other authors as the formation of gamonts and agamonts. It is pointed out that after the rupture of blue bodies, the issuing single parasites are all of the same type. Infection principally affects the parotid lymph node, the outlet for which is partly into the ductus thoracicus and partly into the jugular vein. It is suggested that *Theileria* which escape into the blood stream do not find sufficient lymphocytes and therefore penetrate the erythrocytes, in which cells they are not able to continue multiplication.

R. did not find acaprin of value in the treatment of E.C.F., and suggests that a drug must be sought which has an affinity for lymphocytes.

In the discussion which followed, the relationship between *Th. mutans* and *Th. parva* was discussed, and the position which *Theileria* should occupy in systematic classification. Du Toit pointed out that *Th. parva* had been successfully transmitted by blood inoculation, and also pointed out that primary infection by ticks was not confined to one site on the body.—U. F. Richardson.

I. Mason, J. H., & Alexander, R. A. (1938). **Some Aspects of Rickettsial Diseases of Man and Animals in South Africa.**—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 526-550. 6 figs. [15 refs.] Amsterdam: Societas Neerlandica Medicinae Tropicae. [In English].

II. Donatien, A., & Lestoquard, F. (1938). Les rickettsioses des animaux domestiques. **[Rickettsial Infections of Domestic Animals].**—*Ibid.* pp. 557-564. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In French].

I. The authors investigated the susceptibility of experimental animals to rickettsial strains from "heartwater", rat typhus, boutonneuse fever, tick-bite fever, the blood of a dog, the brain of a sheep and a tick taken from a hare. They carried out cross immunity tests on sheep and also on g. pigs between those strains which were inoculable to g. pigs. They also studied the histological picture produced by these organisms multiplying in the cells of the tunica vaginalis of the g. pig testicle and in those of the chorio-allantoic membrane of the chick embryo. As a result of this work they conclude that these rickettsiae can be divided into three groups:- (1) "Heartwater", which is not inoculable to small laboratory animals, and in sheep fails to give cross-immunity with the other strains. The size, shape and arrangement of the rickettsiae differ from those of the other strains. (2) Rat typhus, which produces an immunity in g. pigs which protects them from infections with organisms of group 3, although immunity to group 3 organisms does

not protect against rat typhus. This rickettsia is not situated intranuclearly either in the tunica vaginalis of g. pigs or in the chorio-allantoic membrane of the chick embryo. (3) Boutonneuse fever, to which all of the remaining strains appeared to be similar, in that they gave cross-immunity against each other. These rickettsiae were not infrequently located intranuclearly in egg membrane cultures.

One of the strains under observation, described as X disease, was isolated by the intraperitoneal inoculation of a g. pig with brain material from a case of " heartwater ". The infection caused at most a slight elevation of temperature in g. pigs, but gave a decided thermal reaction in sheep. It could not be successfully inoculated back from reacting sheep to g. pigs, and it is concluded that it was not the rickettsia of " heartwater ", as sheep which had reacted proved to be still susceptible to " heartwater ".

II. The authors give a general account of the characteristics of the rickettsiae which affect animals and point out that they first appear as quite large homogenous masses staining some shade of red, from light red to almost black, with Giemsa stain. In some cases the masses become granular and break up into the minute, lilac staining particles typical of rickettsiae, and in other cases they break up into irregular bodies which themselves later become granular and give rise to typical rickettsiae.

It is pointed out that *R. conjunctivae* invades epithelial cells only, and although lymphoid nodules form on the infected mucous membrane, the leucocytes of these nodules are not invaded by the organism. The condition appears to be exactly similar to human trachoma. The other animal rickettsiae invade cells of the reticulo-endothelial system, *R. ruminantium* and *R. canis* causing severe diseases comparable to psittacosis and typhus of man, whilst *R. bovis* and *R. ovina* cause mild diseases comparable to trench fever and the milder forms of human typhus. Evidence as to the persistence of infection in rickettsial diseases is discussed, and it is pointed out that in most of them there is evidence that the organisms persist for several months.—U. F. Richardson.

I. Uhlenhuth, P. (1938). Epidemiologie der Weil'schen Krankheit. [**Epidemiology of Weil's Disease**].—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 357-371. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German].

II. Klarenbeek, A. (1938). Einige neuere Untersuchungen über Leptospirosen bei Tieren. [**Recent Investigations into Animal Leptospiroses**]. —*Ibid.* pp. 381-386. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German].

III. Petersen, C. B. (1938). Leptospirenuntersuchungen in Dänemark. [**Research on Leptospirosis in Denmark**].—*Ibid.* pp. 396-406. 5 tables. [9 refs.] Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German].

IV. Schüffner, W. (1938). Zur Systematisierung der Leptospiren. [**Classification of the Leptospira**].—*Ibid.* pp. 407-415. 4 tables. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German].

V. Mino, P. (1938). Eine neue Leptospirose bei den Reisarbeitern Oberitaliens. [**A New Leptospira from Rice Workers of Upper Italy**].—*Ibid.* pp. 422-423. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In German: Discussion pp. 423-424 in French and German].

I. This is a general account of the epidemiology of human leptospirosis which, it is pointed out, has a universal distribution, and is probably a much more

common condition than has been supposed. Infection with leptospira has been detected in rats, house mice, field mice, dogs, cats and pigs, and it has been shown that goats, sheep and horses are susceptible to inoculation.

The disease in man most commonly occurs when man is in close association with rats, and it seems that rats form the principal reservoir host for the leptospira. The infection rate in rats varies according to the locality but may reach 80%, and *Mus decumanus* is more commonly affected than *Mus rattus*. It is pointed out, however, that in spite of the heavy infection rate in the rat population, human disease is comparatively rare, and it is suggested that this is because the leptospira which are passed out with the rat urine are only able to survive for a very short time owing to developing acidity. They survive longest when the pH is between seven and eight. The importance of dogs and other carriers is discussed, but it is considered that man is not usually exposed to infection from these sources. Some outbreaks have been recorded in which rat contamination could not be demonstrated, and in such cases another carrier host should be sought.

In the discussion which followed VAN THIEL said that leptospira could in some cases remain virulent in water for 22 days, and that they could survive for at least five days in slime highly contaminated with urine.

II. K. draws attention to leptospirosis of silver foxes which is usually associated with the presence of infected rats, and to the record of an outbreak of leptospirosis in young pigs, associated with jaundice and apparently caused by *L. icterohaemorrhagiae*. Feline infection has been observed in the Dutch East Indies, the strains involved being apparently of two types, one which affects rats and man, and one which is harboured by field mice. K. found that cats could be inoculated with *L. canicola* and, although no symptoms were produced, leptospira were excreted in the urine, and the serum developed high titre agglutinating power. Dogs may be infected with either *L.i.* or *L.c.*, and in a study of 182 naturally infected animals, it was found that the former infection was most common in animals under two years old. 82% of cases showed symptoms of jaundice and 21% symptoms of uraemia, whilst 7% did not develop clinical symptoms. *L.c.* infection was also most common in young dogs, 3% developed symptoms of jaundice and 38% symptoms of uraemia; 59% developed irregular symptoms, of which the most usual were anorexia and chronic polyuria. The mortality was 41%. It is concluded that the infections cannot be definitely differentiated clinically, particularly as in California outbreaks due to *L.c.* have been recorded in which jaundice was a prominent symptom. Human infection from dogs is probably only rare, and leptospira do not survive for long in dogs which recover from the disease.

III. Human leptospirosis was not detected in Denmark until an investigation showed that 25% of rats were carrying infection. This directed attention to the disease, and 100 human cases have been recorded in the last five years. The majority of human infections are due to *L.i.* but *L.c.* also occurs. In Copenhagen 45% of dogs give positive sera for *L.c.*, whilst in the country canine infection appears to be usually due to *L.i.* A new type of leptospira was isolated from some human cases. This causes mild disease in human beings without jaundice, and the strain does not appear to infect rats or dogs.

IV. The leptospira are here classified as belonging to 19 types which can be distinguished serologically. Of these, five types are confined to animals and five have not been fully investigated. The remaining nine types of leptospira occurring in man can be divided into those which produce jaundice and those which do not. Of the four organisms producing jaundice two are malignant and two benign, whilst the organisms not associated with jaundice are benign. Tables

are also given showing the reservoir hosts, the seasonal prevalence and the pathogenicity to g. pigs of the nine organisms concerned.

V. The name *L. mitis* is suggested for a leptospira isolated from cases of mild fever in rice workers in upper Italy. The organism can be distinguished from *L. canicola*, *L. hepdomadis*, *L. autumnalis* and *L. grippo-typhosa* by serological tests. —U. F. Richardson.

DISEASES CAUSED BY VIRUSES

Haber, P. (1939). Perméabilité de la muqueuse vaginale de la souris pour certains ultravirus. [**Permeability of the Vaginal Mucosa of Mice to Certain Viruses**]. —*C. R. Soc. Biol. Paris.* **131.** 702-704. [2 refs.]

The viruses of St. Louis encephalitis, louping ill and fowl plague respectively were applied to the vaginal mucous membrane of mice. St. Louis virus killed three mice out of five in 9-10 days, louping ill virus killed 100% in 8-10 days, and fowl plague virus 100% in 5-6 days. In each instance the presence of virus in the vaginal mucous membrane and the central nervous system was detected by the intracerebral inoculation of mice. It was found necessary that virus introduced into the vagina of mice should be left *in situ* for 60 minutes.—R. E. Glover.

I. Leclainche, E. (1939). L'épizootie de fièvre aphteuse d'avril 1938 à mars 1939. [**The Epizootic of Foot and Mouth Disease from April, 1938 to March, 1939**].—*Bull. Off. internat. Epiz.* **18.** 17-41. 10 tables, 3 graphs, 1 map. Discussion pp. 367-382 and 389-462.

II. Müssemeier. (1939). Les plus récentes données sur la prophylaxie de la fièvre aphteuse. [**The Most Recent Contributions on the Prophylaxis of F. & M. Disease**].—*Ibid.* 42-53.

III. Leclainche, E. (1939). L'épizootie actuelle de fièvre aphteuse et les possibilités de sa prophylaxie. [**The Present Outbreak of F. & M. Disease and the Chances of its Control**].—*Ibid.* 54-62.

IV. Flückiger, G. (1939). A propos de l'abatage dans la fièvre aphteuse. [**The Slaughter Policy in F. & M. Disease**].—*Ibid.* 63-77.

V. Flückiger. (1939). Sur la marche de la fièvre aphteuse en Suisse de juin, 1938 à mai 1939. [**F. & M. Disease in Switzerland from June, 1939 to May, 1939**].—*Ibid.* 78-81. [Fuller version appeared in *Schweiz. Arch. Tierheilk.* **81.** 376-390. (1939)].

VI. Petersen, G. (1939). La fièvre aphteuse au Danemark, 1937-1939. [**F. & M. Disease in Denmark, 1937-1939**].—*Ibid.* 82-97. 5 tables. 1 map.

VII. —. (1939). L'étude de l'épizootie aphteuse. [**Discussion on F. & M. Disease at 13th Meeting of the Office International des Epizooties, 1939**]. —*Ibid.* 367-382 and 389-462.

I. L. previously [*V. B.* **9.** 82] described the spread of the disease from its origin in North Africa at the beginning of 1937 up to the end of March 1938. With the aid of a map, graphs and tables, in the report now dealt with he describes the spread from West to East Europe between April, 1938 and March, 1939. Details are given of the incidence of the disease and of the occurrence of new centres of infection in France, Belgium, Luxemburg, the Netherlands, Switzerland Italy, Germany, Austria, Czechoslovakia, Hungary, Poland, Denmark, Sweden, Jugoslavia, Albania, Rumania, Bulgaria, Greece, Spain and Portugal. In Western Europe the peak period occurred in August, 1938, and by the end of that year the disease had invaded all Western and Central Europe as far as the frontiers of

East Prussia, Poland and Rumania. Outbreaks had also occurred in Finland and Lithuania, but European Russia was free in November, 1938.

II. M. summarized at great length the chief difficulties encountered in efforts to combat epizootics of F. & M. disease, reference being made to the existence of " carriers " amongst recovered animals. He discussed the use of hyperimmune serum and its limitations, and referred to the Riems vaccine. He considered that it had great possibilities, particularly if the difficulties of producing large quantities could be overcome.

III. L. discussed the measures of defence which can be employed against F. & M. disease. These consist of (1) sanitary measures, comprising isolation and the slaughter of affected and in-contact animals, (2) passive immunization—*e.g.* haemotherapy or seiotherapy, and (3) active immunization.

The first method does not give good results in countries with land frontiers when there is great risk of reintroduction. Passive immunization may prove useful in certain instances, but experience shows that it will not halt the progress of an epizootic. All research therefore must be concentrated on active immunization. Up to the present the Riems vaccine is the only one which holds out any promise. Difficulties still remain in procuring a sufficient supply of virus for its preparation, in producing a polyvalent vaccine, and in prolonging its keeping properties.

IV. F. maintains that the most successful method of prophylaxis is to slaughter all affected animals and to confer a passive immunity on all neighbouring herds by means of serum, or better still, an active immunity by means of a suitable vaccine. By this method all sources of infection are removed and any risk of " carriers " eliminated, and at the same time complete disinfection of the infected premises is possible.

V. F. describes how Switzerland succeeded in controlling F. & M. disease until September, 1938, when it invaded the country from southern Germany and the French frontier. It occurred at a most unfavourable time for prophylactic measures, there being a great deal of traffic in agricultural products etc. and the disease got the upper hand; it was consequently not possible to localize it to the frontiers. In October the slaughter policy was abandoned, and the disease was left to run its course, with unfortunate results. By December the number of outbreaks was fewer, and conditions improved during the ensuing months.

F. refers to the success of the prophylactic measures referred to in IV. Both crystal-violet and formolized vaccines were tried, but were not a great success. The Riems vaccine, however, gave very promising results. It was innocuous and four months after vaccination none of the vaccinated animals had contracted the disease.

VI. Since 1900 Denmark has had six invasions [the word " invasion " is used strictly in this case, and must not be confused with " outbreak " ; an invasion sometimes lasts for years] of F. & M. disease, but those of 1925, 1926 and 1938 were the most serious. In the 1924-7 outbreak two types of virus were present, at first O and later A. The present outbreak was caused by O with isolated cases of A infection. It commenced in the autumn of 1937, but was not serious until July 1938. The peak occurred in November 1938, and early in 1939 the number of outbreaks fell rapidly. Until September 1938 all affected animals were slaughtered, but after that date this policy was discontinued, except for new outbreaks in newly invaded provinces. How the disease was introduced remains obscure, but it is interesting to note that the disease commenced in the islands and not in Jutland. It is difficult to state whether the slaughter policy in the early stages had any influence on the subsequent progress of the disease, but P. is

inclined to think that it had a favourable effect on control, that probably it shortened the epizootic and made it less severe.

P. describes his first impressions of the use of a vaccine having the same composition as the Riems vaccine ; the results obtained were considered to have been satisfactory.

VII. This interesting discussion was opened by LECLAINCHE and he recapitulated many of the points dealt with in I. He traced the spread of the 1937 outbreak through Europe and spoke of the value of the Riems vaccine. WALDMANN gave details of the results obtained with the Riems vaccine.. He believed that when they were able to prepare sufficient vaccine, its use, along with police measures, would solve the problem of controlling the disease. A bivalent vaccine had been prepared ; it had been shown experimentally that a trivalent vaccine could be made. BOES stated that in 1937-1938 Belgium had experienced its worst outbreak of the disease. Numerous outbreaks of infection due to A type virus occurred in animals previously infected with O virus. WILLEMS referred to the failure which attended the use of formolized vaccine, and gave a detailed account of the comparative value of whole blood, plasma and the serum of convalescents in prophylaxis. MÜSSEMEIER referred to the fact that in Germany approximately 23,000 herds which had been infected with type O later became infected with A. FRENKEL stated that both types had also occurred in Holland. PETERSEN discussed the outbreaks in Denmark (see VI) and gave a detailed report on the results of vaccination in that country between November 1938 and May 1939. CHONTOFF described the occurrence of the disease in Bulgaria. BOUSSARD described the outbreaks in France, and said that hitherto no vaccination had been carried out by the veterinary services. CABOT presented a statement showing the number of outbreaks which had occurred in Great Britain from October 1937 to March 1939, and gave details of the number of animals slaughtered, the amount of compensation paid and the number of outbreaks due to each of Types A, O and C.

Contributions were made on the possibility that " carriers " might result from vaccination. WALDMANN stated emphatically that in his experience no animal treated with the Riems vaccine had become infected, except in certain infected localities where animals appeared to have been vaccinated during the incubation period of the disease. The question was then asked whether the vaccine was living, attenuated or dead, and a long discussion followed on the differentiation between vitality and virulence.—GWILYM O. DAVIES.

I. PIÉROT. (1938). Les principes azotés et fièvre aphteuse. [**The Influence of the Nutritional State on Foot and Mouth Disease**].—*Rev. Path. comp.* **38.** 1048-1050.

II. PIÉROT, M. (1938). Nouvelles remarques sur la fièvre aphteuse. [**Notes on F. & M. Disease**].—*Ibid.* 1187-1190.

III. VELOPPÉ. (1938). Fièvre aphteuse : vente de lait provenant d'animaux malades. [**France : The Law Concerning the Sale of Milk from Cows with F. & M. Disease**].—*Rec. Méd. vét.* **14.** 412-416.

I. Observations indicated that animals living under extremely good conditions are predisposed to infection. The common sites of the lesions are highly vascular regions where the transformation of nitrogenous material is active. [This paper and the one that follows are of a clinical nature].

II. Virulence appears to be increased in animals fed on highly nitrogenous food. An attenuated virus may cause a severe form of the disease when inoculated into an animal given such a diet.

III. The difficulties which have arisen in the interpretation of the law are discussed. The sale of milk from infected animals is now illegal.—F. H. Manley.

Belin. (1939). De la vaccination anti-aphteuse. [**Vaccination against Foot and Mouth Disease**].—*Rev. Path. comp.* **39.** 415-421. [Numerous refs.] [Discussion pp. 421-423.]

B. describes what he speaks of as " complexe vaccino-aphteuse "—a mixture of variola and F. & M. viruses obtained by the simultaneous infection of heifers with both viruses—and states that the site of inoculation (*champ vaccinal*) is a plentiful and rich source of the virus of F. & M. disease [contrary to other authorities, who are cited]. According to B. the " complexe " has remarkable viability in cold storage, (not less than four years), and good results are claimed with a formolized vaccine.—E. O. Longley.

Fogedby, E. F., & Harbo, J. (1939). Immunisation des bovidés contre la fièvre aphteuse au moyen de virus adsorbé à l'hydroxyde aluminique. [**Immunization of Bovines against Foot and Mouth Disease by Means of Virus Adsorbed on Aluminium Hydroxide, at Lindholm, Denmark, 1939**].—*Bull. Off. internat. Epiz.* **18.** 98-117. 4 tables. [18 refs.] [Appeared also in *Maanedsskr. Dyrlaeg.* **51.** 162-178].

Material for the production of vaccine was obtained by copiously inoculating the tongue of a bovine under general anaesthesia. After 24 hours the beast was killed and about 50 g. of vesicle material obtained. This was titrated with neutral distilled water, centrifuged, filtered, the pH adjusted and the virus adsorbed on aluminium hydroxide. The mixture was then inactivated at 37°C., or stored at 2°C. and subsequently inactivated. Seventy-two hours' inactivation was required to produce a safe vaccine. Many of the vaccination experiments were invalidated as cattle became infected a few days after the first inoculation, presumably by natural infection. Three herds, comprising 600 animals, were given 10 c.c. of a vaccine containing 1% vesicle material and 1·8% Al_2O_3; 9-15 days later they were given 2–10 c.c. of the same vaccine. Natural outbreaks of the disease occurred in most of the herds at varying periods after the second inoculation. Only one-third of the animals was affected, however, and at that very mildly.

In the second experiment, 221 animals were given 10 c.c. of vaccine containing 1% epithelium type O and 1·8% Al_2O_3; 14 days later they received 4 c.c. of vaccine containing 2% epithelium type O, 2% type A and 1·8% Al_2O_3. F. & M. disease occurred in this herd 8–9 days after the second vaccination,but only very few animals were affected and then mildly. Unvaccinated pigs on the same farm were severely affected. Finally, 414 animals were inoculated as in the latter experiment, but 14 days after the second dose of vaccine they received 2 c.c. of a similar vaccine. These animals showed a strong immunity to natural and artificial infection. It is claimed that a very valuable immunity was produced, but it is admitted that much remains to be learned about the method.—John Francis.

Kling, C., Huss, R., & Olin, G. (1939). Présence du virus de la fièvre aphteuse dans le contenu intestinal d'un sujet humain vivant dans un milieu infecté. [**Presence of Foot and Mouth Disease Virus in the Intestinal Contents of Human Beings Living in an Infected Area**].—*C. R. Soc. Biol. Paris.* **131.** 478-480. [4 refs.]

Some workers have considered that man plays a considerable part in the spread of F. & M. disease, and one case is quoted in which the virus was isolated from the nasopharynx and intestine of a man for several weeks.

The faeces of 47 persons living on 17 infected farms were examined for the presence of virus. Material was filtered or treated with a volatile antiseptic and inoculated intraperitoneally into g. pigs; the pads were then scarified. Other g. pigs were inoculated intradermally with faeces which had been treated with glycerin.

Virus was recovered from one person who had, like all the others, drunk raw milk. The virus obtained was of the same type as that infecting animals on the farm.—JOHN FRANCIS.

FRENCH, M. H. (1939). **Serum Protein Changes in Different Types of Cattle During Immunisation against Rinderpest Virus.**—*J. comp. Path.* **52.** 183-191. 9 tables. [3 refs.]

The examination of the blood of cattle of various breeds and susceptibilities confirms the serum-protein changes observed in previous work on rinderpest in zebus. The results obtained with grade Ayrshires and Friesians, and also with highly susceptible Ankoles, show that immunization against rinderpest is attended by changes in the serum-protein fractions which are not dependent on breed, but are the direct result of immunization. The changes consist of an increase in the globulin and a decrease in the albumin fractions. The globulin increase is chiefly due to an increase of the euglobulin fraction, though occasionally the pseudo-globulin fraction is also increased.

The time taken to develop the maximum euglobulin content appears to be shorter in zebus than in other types of cattle examined, but the maximum value reached is of the same order for each type.—R. FISHER.

I. BAWA, H. S., & HAJI, C. S. G. (1939). **Active Immunisation with Goat Tissue Virus in Sheep against Rinderpest.**—*Indian J. vet. Sci.* **9.** 195-207. 10 figs. [6 refs.]

II. SINGH, B. (1939). **Goat Virus Vaccination in the Central Provinces and Berar (Final Report).**—*Ibid.* 279-298. 7 appendixes.

I. Six sheep, each inoculated subcutaneously with 1 c.c. of goat tissue virus, showed febrile reactions and transient loss of appetite, but no other symptoms. All the sheep failed to react to a subsequent test dose of 1 c.c. of hill-bull blood virus, two controls developing marked febrile reactions, but no other symptoms. In an outbreak of rinderpest in sheep, vaccination with goat tissue virus proved successful, 50 sheep being vaccinated without loss, while 10 out of 20 uninoculated animals died. SRIKANTAIAH [*V. B.* **5.** 271.] and others have not found goat virus vaccine so successful for sheep.

II. This is the report of a three-year scheme, 1935-1938, financed by the Imperial Council of Agricultural Research, in which the value of goat virus vaccination for the immunization of cattle under field conditions was studied. During the period covered 382,621 cattle were inoculated by various methods, and results were very satisfactory. Generally speaking the policy was to inoculate all cattle in villages lying along all main routes used by nomadic herds. Muktesar goat blood virus was at first used and it proved quite safe in local cattle, although it was sometimes advisable, *e.g.* in heavy milch buffaloes of unknown susceptibility, to give a small dose of serum to lessen the risk of severe reaction and to prevent excessive loss in milk yield. Otherwise the "goat virus alone" method proved ideal for general use in the field. The Muktesar goat blood virus was passaged locally 263 times without change of potency. A local strain was found to become attenuated for cattle after the 40th goat passage, though reactions in buffalo calves were still severe. After the 80th passage the local virus became milder for buffaloes

also, and then appeared to be of fixed virulence. It was further passaged 191 times without loss of potency and was used extensively in field operations.

Manufacture of goat tissue virus was commenced in the Central Provinces for local use in 1936, and Muktesar goat tissue virus was also used. Reactions with the tissue virus are milder than those with the blood virus in both cattle and buffaloes. Experience suggested that healthy male goats two to three years old were best for virus production. Sheep were unsuitable, as the reaction was erratic. It was deemed advisable to keep virus animals under observation for 24 hours before inoculating them, and to examine blood smears before bleeding. Blood virus remained potent for 120 hours in the Central Provinces in winter; in summer it was necessary to pack virus bottles in ice. Tissue virus, issued in ampoules, remained viable for 10-12 days in winter, and 5–6 days in summer.

No exact figures are available but it is suggested that vaccination is followed by a [? temporary] loss in milk yield of 20-50%. A small experiment suggested that this loss is reduced somewhat if a small dose of serum is given simultaneously.

In blood smear examinations of 2,180 vaccinated cattle made during the period of reaction to the vaccine, *Babesia bigemina* was found in 2·6% and *Theileria mutans* in 17·75%, but the former rarely and the latter never gave rise to clinical signs of illness. Trypanosomiasis has to be guarded against in enzootic areas. Latent coccidiosis sometimes becomes overt in vaccinated animals, but responds to treatment if taken in time. The longest observed period of immunity after goat blood virus vaccination was three and a half years; immunity to goat tissue virus had not been tested beyond one year. Vaccination of calves under six months old is not recommended, as immunity conferred may be transient.

Apart from the value of the scientific data obtained, the Province had materially benefited by mass vaccination of cattle in certain areas, and the field tests have shown the great value of goat virus either for controlling outbreaks or for prophylaxis. The chances of spread of infection from vaccinated to non-vaccinated animals are said to be remote.—H. E. Harbour.

Mettam, R. W. M., & Ford, J. (1939). **Experiments on the Transmission of Bovine Pleuro-Pneumonia with a Report on a New Method of Testing Immunity Following Vaccination.**—*J. comp. Path.* **52.** 15-28. 4 figs. [5 refs.]

A reliable laboratory method for testing immunity conferred by culture vaccine has long been needed and hitherto such tests have been performed by contact with infected animals or by the subcutaneous inoculation of virus. Both of these methods have serious defects as contact is an uncertain method of transmitting the disease, and local reactions following subcutaneous inoculation of virus are frequently similar in vaccinated and unvaccinated animals. Daubney [*V. B.* **5.** 808.] has shown that characteristic lung lesions can be produced in cattle by the intravenous injection of agar emboli containing lymph or recently isolated organisms. The object of the present experiments was to ascertain whether similar results could be obtained with cattle in Nigeria, and if so to carry out immunity tests on vaccinated cattle.

Two series of experiments were performed to confirm artificial infection. The emboli were prepared by mixing 5% virus or culture with 10% agar cooled to 40°C. The agar mixture was aspirated into cannulae 90 mm. long with a bore of 9 mm. The intravenous injections were made with precautions so as to avoid escape of virus into the connective tissues, and of a total of 30 animals inoculated, none showed any local reaction. In the first experiment ten cattle were inoculated with emboli containing shoulder lymph and pronounced lesions of chronic con-

tagious pleuro-pneumonia were obtained in five animals. In the second experiment a fifth generation sub-culture was used. Seven animals were inoculated intravenously, another two intrathoracically and in another the embolus was injected deep into the left lung. These animals were destroyed 22-28 days after inoculation and nine showed pronounced lesions.

For the immunity test ten animals were used which had been tail vaccinated seven months previously with pleuro-pneumonia culture of the 120th generation. They were inoculated with agar emboli prepared with shoulder lymph from a natural case of the disease. In only one animal were lesions subsequently found.

In concluding the authors stress the following facts. In cattle inoculated with agar plugs containing lymph or culture there are often well-marked clinical symptoms following an incubation period averaging one week. Sequestration and encapsulation may be complete in as short a period as 15 days after the appearance of clinical symptoms. No lung lesions were found in the two animals which received virus into the thoracic cavity though there was extensive fibrinous pleurisy.

A description of the lesions is given in the case of each animal in which they were found to occur.—S. J. Gilbert.

Shirlaw, J. F. (1939). **Observations on the Existence of Contagious Bovine Pleuro-Pneumonia in British India, with an Account of Preliminary Pathological Investigation of Cases of this Disease Reported from Assam.**—*Indian J. vet. Sci.* **9.** 139-150. 3 figs. on 2 plates. [20 refs.]

A report was made in 1936 that the disease occurred in Assam, and as a result an investigation was made in Muktesar of material received from that province.

S. did not find any evidence that contagious bovine pleuro-pneumonia exists or has existed in India. At the end of the last century and early in this one certain reports were made that the disease existed. The evidence appears to be that these were due to erroneous diagnosis.

The lungs were marbled and closely resembled those from cases of contagious bovine pleuro-pneumonia. Cultural and subinoculation experiments failed to isolate the virus or reproduce the disease.—R. Fisher.

Girard, H. (1939). Nouvelle tentative de vaccination contre la péripneumonie bovine à l'aide de la sérosité pleurale incorporée dans la lanoline. [**Vaccination against Contagious Bovine Pleuro-Pneumonia with Pleural Exudate Incorporated in Lanolin**].—*C. R. Soc. Biol. Paris.* **130.** 1261-1263. [4 refs.]

Calves aged from 5-12 months were inoculated with infective fluid from the pleural cavity; others were inoculated with the same material incorporated in lanolin, the doses in both cases being 0·25 c.c., 0·5 c.c., 1 c.c. or 2 c.c. of fluid. All animals given the untreated material died with typical symptoms, but in the case of those given the lanolin suspension, local reactions and death were delayed according to the dosage. Adult cattle were also inoculated with the lanolin-treated vaccine in doses of 0·25 c.c. or 0·5 c.c. of fluid. The local swellings in ten animals which received the smaller dose varied from the size of a hazel nut to that of an apple.

In six animals which received the larger dose the reactions were much more marked. In further experiments one animal was severely affected following a dose of 0·2 c.c. of the lanolin-treated material and was destroyed.—S. J. Gilbert.

Zwick, W. (1939). Ueber die Bornasche Krankheit. [**On Borna Disease**].—*Z. InfektKr. Haustiere.* **54.** 1-7. [3 refs.]

In a recent communication, Holz [*V. B.* **9.** 309.] refused to accept the

opinion expressed by Z. and his collaborators [*V. B.* **8.** 433; **9.** 389.], on the ground of their experimental work, that the haemorrhagic encephalitis considered by HOLZ to be a special form of Borna disease, is really the result of some intercurrent infection, most probably equine infectious anaemia. In a critical review of HOLZ's article Z. now states that, notwithstanding the arguments adduced, he still persists in the same view. He stresses the point that numerous cross-immunization and cross-neutralization experiments have amply proved the identity of HOLZ's virus with that of Borna disease, a fact further confirmed by rabbit inoculation. The existence of haemorrhagic encephalitis is not contested, but the question of how it arises still remains to be solved.

PARLIER. (1938). Deux ans de prophylaxie sanitaire contre la peste equine. [**Two Years of Prophylaxis against Horse-Sickness**].—*Rev. vét. milit.* **22.** 259-267.

P. states that his experience in French West Africa supported the view that the virus of African horse-sickness is chiefly, if not solely, distributed by mosquitoes, and more particularly by *Stegomyia fasciata*. In St. Louis and Dakar, where in former years mortality from the disease was very high among horses and mules imported during the breeding season of the insects (October-November), excellent control of the infection was obtained by sending all the freshly arrived animals to points free from mosquitoes at night, during the dangerous period, and by anointing the thin, exposed areas of their skins with a suitable repellent.

TOPACIO, T. (1939). **A Method of Immunization with Crystal Violet Vaccine against Hog Cholera (Preliminary Report).**—*Philipp. J. anim. Indust.* **6.** 341-352. 4 tables. [5 refs.]

Seven pigs were given crystal-violet swine-fever vaccine, prepared according to the technique of MCBRYDE and COLE [*V. B.* **8.** 92], in a dose of 1 c.c. per 5-10 lb. body weight, together with simultaneous inoculation of 5 c.c. per 50 lb. body weight of a mixed infection vaccine (*Bacterium coli*, *Salmonella choleræ-suis* and *Pasteurella suiseptica*). Three weeks later they were given subcutaneously, to test their immunity, 1 c.c. of hog-cholera virus. Three pigs showed a mild temperature reaction. The others were not affected.

Eight pigs were treated in a similar manner except that the mixed-infection vaccine was administered two weeks before the crystal-violet vaccine. When tested later with live virus, one showed a temperature reaction and the others were unaffected.—D. D. OGILVIE.

VON BENEDEK, L. (1938). Die Immunisierung der Saugferkel gegen Schweinepest mit Hilfe der Virus- und Simultanimpfung. [**Immunization of Unweaned Pigs against Swine Fever by Virus and by Serum-Virus Simultaneous Inoculation**].—*Berl. Münch. tierärztl. Wschr.* Dec. 16th. 765-771. 4 tables. [Numerous refs.]

When the sow is immunized four to ten days before parturition, the piglets tend to be resistant to infection for about one to two weeks; when the sow is immunized one to two months before parturition, abortion is common or unhealthy piglets are born. A piglet of an immunized sow nursed by a non-immunized animal, showed resistance to infection. Unweaned piglets of sows immunized before parturition can be immunized by virus only, but some of them may develop severe reactions due to imperfect passive immunity acquired from the mother. Simultaneous inoculation of virus and serum at the age of four to six weeks is, however, generally recommended. Simultaneous inoculation at an earlier stage is not

advisable, since the piglets are apt to develop intestinal catarrh. A further virus inoculation should be given 30 days after the first, and a third 30-40 days after the second. To obtain a durable immunity, the animal should be inoculated again with virus at the age of about one year, or before admittance to breeding. The result of the inoculation is often influenced by intercurrent diseases common in unweaned pigs, such as rickets, tetany, broncho-pneumonia, " exanthema " and paratyphoid. The presence of such diseases is a contra-indication for immunization. Piglets of non-immunized mothers can be immunized by simultaneous inoculation even a day after birth, but the serum dose should be large (8-20 c.c.) : as stated above, this procedure is considered to be inadvisable.—V. Chládek (Prague).

Popovici, I., & Diuligher, T. (1936). Infectiunea intra-uterină de pestă la purceii născuti după 2 luni dela sero-virulizarea scroafelor mame. **[Congenital Swine Fever in Pigs Born of Sows given Serum and Virus]**.—*Arhiva vet.* **28.** 12-15.

Nine sows on an infected farm were immunized against S.F. Four of them later produced litters of normal piglets and five of them produced litters which died within 1-50 hours of birth, being completely paralysed. A healthy piglet 2½ months old inoculated with 5 c.c. (subcut.) of emulsion from the organs of one of the dead piglets is stated to have contracted typical S.F. and died. *Salmonella cholerae-suis* was grown from the organs of another similarly inoculated piglet. The authors deduce that the piglets born of the simultaneously inoculated sows died of S.F. contracted *in utero*. [The authors do not appear to have provided convincing evidence to support this view].

Flament, R., & Martin, L. (1938). Note au sujet d'une enzootie d'ecthyma contagieux. **[An Enzootic of Contagious Ecthyma in Sheep]**.—*Maroc méd.* **18.** 419-420. [5 refs.]

A mixed flock of 68 merino, chamois and Boukkaza sheep imported into Morocco developed this disease after 15 days quarantine. Material from scales collected from affected animals was inoculated by scarification in the region of the brisket of rather less than one third of the animals that were still unaffected when it was ready for use. The results are considered to have been satisfactory. A general account is given of the course of the outbreak.—C. V. Watkins.

I. Remlinger, P., & Bailly, J. (1939). Présence de virus rabique dans la rétine, la choroide, le corps vitré et le cristallin. **[Presence of Rabies Virus in the Retina, Choroid, Vitreous Humour and Lens of the Eye]**.—*Maroc méd.* **19.** 251-252.

II. Remlinger, P., & Bailly, J. (1939). L'humeur aqueuse des animaux morts de rage, ne renferme pas de virus rabique. **[The Aqueous Humour of Animals Dead of Rabies does not Contain Rabies Virus]**.—*Ibid.* 252-253. [3 refs.]

I. The authors found that the virus of rabies may be harboured in certain parts of the eye. Emulsions made from the retina, the choroid, the vitreous humour, and from the crystalline lens, obtained from the eyes of rabid dogs, cats, and rabbits, were inoculated subdurally and intramuscularly (and in some instances into the anterior chamber of the eye also) into rabbits. Nine positive results were obtained in ten experiments carried out with the retina, four positive in eight with the choroid, and four positive in seven with the vitreous humour. In ten experiments with the crystalline lens, one proved successful.

II. After referring to numerous experiments in which inoculations of aqueous

humour, obtained from the eyes of dogs and rabbits dead of rabies, were made into rabbits and g. pigs with negative results, the authors give details of three further experiments. In each of these, a g. pig was inoculated with large amounts of similar material over an extended period (11-32 days), but failed to show any symptoms of rabies.—J. R. Lawson.

Behrens, C. A., Schweider, L. B., Barker, J. F., & Reeves, J. L. (1939). **Immunization Against Rabies using Avirulent Purified Vaccines.**—*J. infect. Dis.* **64.** 252-260. 1 fig., 4 tables. [4 refs.]

A description is given of a method of clarifying the virus by iso-electric point precipitation (pH 4·5–5·2). Tests on rabbits were carried out to find the relative values of vaccines from which different proportions of the protein had been so removed, the greatest being 60%.

The M.L.D. of the supernatant fluids decreased as the percentage of the protein diminished, and vaccines made from the precipitates did not protect against the disease. The virus was rendered avirulent by exposure to pH 5 for 24 hours at 25°C.—J. R. Lawson.

de Bettencourt, A. (1939). Le traitement antirabique à l'Institut Cãmara Pestana en 1935-1936-1937. [**Antirabic Treatment at the Cãmara Pestana Institute in 1935, 1936 and 1937**].—*Arch. Inst. bact. Cam. Pest.* **7.** 413-421 and 433.

The vaccine used for persons infected by rabid animals, consisted of a 5% suspension of brain or spinal cord fixed virus, phenolized at 1% and kept in an incubator for 24 hours. The course of treatment comprised 15-40 daily injections of 5 c.c.

The results are given under the usual headings (locality, sex, site of bite, etc.). In 1935, 945 infected persons were vaccinated, in 1936, 637 and in 1937, 933. Cats were responsible for nearly half as many cases as dogs; other animals, occasionally responsible, included horses, asses, pigs, foxes, monkeys and rabbits. —J. E.

Monteiro da Costa, A. (1939). Vaccination antirabique du chien. I. Pouvoir rabicide du sérum après l'injection de différents types de vaccine. [**Antirabic Vaccination of the Dog. I. Rabicidal Power of the Serum after the Injection of Various Kinds of Vaccine**].—*Arch. Inst. Bact. Cam. Pest.* **7.** 397-405. 1 table. [English and German summaries].

The author vaccinated dogs once with various vaccines and obtained serum from them 12-14 days later. The serum was mixed with fixed virus, left for 30 days in cold storage and then the mixture was tested for virulence by intradermal inoculation of rabbits. In this way it was found that antiviral antibodies were present in the serum of immunized dogs, but not constantly, nor in sufficient quantity to neutralize virus completely.

An average of three dogs was used for each vaccine, but no definite conclusions as to the values of the different vaccines could be drawn from the results. The vaccines used included those prepared by the methods of Umeno and Doi (carbol-glycerine), Kondo (carbol-glycerine), Kelser (chloroform), Fermi, Puntoni, Pereira da Silva (phenol), Verge and van Huyen (formol-glycerin) and Remlinger (ether).

Rabicidal power of the serum appeared to vary directly with the immunizing potency of the vaccine.—J. E.

Shope, R. E. (1937). **The Effect of *Hemophilus influenzae suis* Vaccines on Swine Influenza.**—*J. exp. Med.* **66.** 169-175. 1 table. [7 refs.]

A live and a heat-killed vaccine were prepared from cultures of two strains of *Haemophilus influenzae suis* and were inoculated intramuscularly into small numbers of pigs, which were infected 9-14 days after vaccination by intranasal inoculation of swine influenza virus and *H.i.s.* All pigs were subsequently killed and examined for influenza lesions in the respiratory tract. It appeared that either vaccine conferred a partial immunity, which was greatly inferior to that conferred by swine influenza virus vaccines.—J. E.

Broadhurst, Jean, Cameron, Gladys, & MacLean, M. Estelle. (1939). **A Filtrable Virus Isolated from Mastitis Cows.**—*Cornell Vet.* **29.** 261-270. 18 figs. on 2 plates. [8 refs.]

Since mastitis is characterized by a low intensity and chronic infection, and since sulphanilamide and similar preparations appear to be ineffective in its treatment, the possibility that a virus might be implicated as an aetiological factor was investigated.

Milk was centrifuged 2-4 hours after collection, and the precipitate was examined in thin smears differentiated by a modification of Seller's rabies stain. Inclusion bodies were present in many samples, and appeared as clear, sky blue bodies on a pinkish background of milk cells, one or more being present in a cell. The cells of normal milk examined at the same time were found to be free from inclusions.

For the tissue culture experiments fibroblasts, epithelium, and leucocytes from chick and mouse embryos were used, and a minute drop of filtrate was added to each culture. A virus was isolated by this means from both the milk and blood of mastitis cows, and has been carried through 32 serial transplants to date. Storage of the filtrates at 5°C. for four weeks did not inactivate them.

Animal inoculations have been performed only in mice, which were injected with 12-passage tissue cultures. Ten days later the lymph nodes and mammary glands were greatly enlarged, although controls were normal. Close examination of the organs failed to reveal bacteria, but the virus was easily re-isolated from them.—D. D. Ogilvie.

Kaura, R. L., & Iyer, S. G. (1938). **Studies on a Natural Outbreak of Pigeon-Pox.**—*Indian J. vet. Sci.* **8.** 199-211. 4 figs. on 2 plates, 6 tables. [19 refs.]

The authors describe experiments with pigeon-pox virus obtained from the first recorded natural outbreak of the disease in India, in a stock of 58 experimental pigeons, of which 28 became affected and six died. Passage experiments were done with pigeons and with fowls.

In cross-immunity tests four out of five pigeons immunized with an English strain of pigeon-pox virus showed no immunity to the Indian strain. The fifth bird resisted both strains. Further tests supported this finding. A reverse series of tests again showed immunological differences between the two strains of virus. Clinically, the disease set up was indistinguishable and both viruses gave equal protection against fowl pox.

Complement-fixation tests were found unreliable for diagnostic purposes.
—C. V. Watkins.

Burnet, F. M. (1939). **A Note on the Occurrence of Fatal Psittacosis in Parrots Living in the Wild State.**—*Med. J. Aust.* April 8th. 545-546. [4 refs.]

It is now well known that Australian parrots and cockatoos captured in their wild state are frequently infected with psittacosis virus. As a rule they show no

symptoms, but the infection can be established by P.M. examination and by the inoculation of spleen and kidney into mice.

B. now records outbreaks of fatal psittacosis in wild parrots in three Australian states. He discusses some factors which may possibly contribute to the increase in severity of this usually benign disease. He considers that the fatalities among wild birds provide another warning of the potential danger to man of the trade in parrots and cockatoos, and a strong argument for its prohibition.—T. S. G.

Lazarus, A. S., & Meyer, K. F. (1939). **The Virus of Psittacosis. I. Propagation and Developmental Cycle in the Egg Membrane, Purification and Concentration. II. Centrifugation, Filtration and Measurement of Particle Size. III. Serological Investigations.**—*J. Bact.* **38.** 121-151, 153-169 and 171-198. 3 figs., 14 tables. [Numerous refs.]

I. The authors give a review of the subject.

In the preliminary investigations on the growth of the virus in the chorio-allantoic membrane of the developing chick embryo, three strains of virus were used :– (1) Australian OH strain from Australian shell parrakeets ; (2) Rheinen strain from a human case infected by contact with shell parrakeets ; and (3) Maine strain, from shell parrakeets. All three strains had been propagated through susceptible white mice and occasional birds as well as by egg membrane culture. After about 15 passages the time prior to the death of the embryo was stabilized at about 72–96 hours, and in subsequent passages it remained at about this level. Embryos 9–10 days old, incubated at 35·5–36·5 C., were found to be the most satisfactory media. At these temperatures, which are lower than those generally used, the death of the embryo was delayed, and thus a larger quantity of virus was obtained. The explanation of this delay appears to be that the lower temperature compensates for the excess heat which is generated in an infected embryo. L.C.L. bodies were shown to be present in the livers and spleens of infected embryos, but in considerably smaller numbers than in infected membranes.

The lesions seen upon the chorio-allantoic membrane are described. Greyish areas appeared, opaque and thickened with oedema, with a tendency to spread over the membrane. The opacity was shown to be due to a cellular infiltration between the ectoderm and the endoderm. Stained impression smears showed the L.C.L. bodies in infected membranes as early as the 40th hour, contained in the ectodermal and leucocytic cells.

Observations made on the L.C.L. bodies at varying times of incubation showed the presence of a number of forms. This led the authors to postulate a developmental cycle—division of relatively large early forms by fission leading to distention and rupture of the containing cell.

The infected chorio-allantoic membrane contained an abundance of L.C.L. bodies and was regarded as a good source of virus. The authors worked with two types of suspensions of virus in buffered water and buffered saline, " crude suspension " and " purified suspension ", the lipoids and soluble proteins of the latter having been removed.

Both crude and purified virus suspensions lost their infectivity for mice after storage for relatively short periods in the ice chest, *e.g.* 30 days.

II. Attempts to free completely the supernatant fluid of L.C.L. bodies by centrifugation up to 14,000 r.p.m. failed.

It was possible to concentrate the virus by centrifugation, but not to spin it down completely, even when adsorbing agents and gelatin-coated tubes were used. This work also showed that a fair amount of virus was lost during the preparation of the purified virus suspensions described above.

Filtration.—Attempts to filter crude suspensions of egg-membrane virus at 19-23°C. through Seitz EK, Chamberland LB, and Berkefeld N, W and V filters, gave results which the authors considered negative on a quantitative basis, *i.e.* in the majority of filtrates no virus could be demonstrated, and in those in which small amounts of virus were present, the titre had been greatly reduced.

Ultra-filtration.—Ultra-filtration through Elford's gradocol filters yielded consistently positive results. The average pore size of the collodion filter used was $0{\cdot}6\mu$ or less, giving a filtrate with no loss of titre for mice.

The estimated end-point of ultra-filtration was in the region of an average pore diameter of 400 mμ. Using the correction factors suggested by Elford, the particle size of the virus was estimated to be between $0{\cdot}2$-$0{\cdot}3\mu$, results which agree with those obtained by other workers. Photomicrographic measurements agreed with the above figures, giving results between $0{\cdot}28$-$0{\cdot}38\mu$. These higher figures are accounted for by the errors inherent in the photomicrographic method of measurement.

The authors believe that the infective agent of psittacosis is the elementary body itself or some invisible particle of the same size ; the former theory is favoured as the more probable.

III. Normal healthy g. pigs, approximately 300 g. in weight, were immunized by receiving an initial dose of 0·5 ml. of a purified suspension of psittacosis virus (described above) containing approximately $1{\cdot}5 \times 10^9$ active elementary bodies, and a series of subsequent doses, at intervals of 5-8 days, containing twice this number of L.C.L. bodies.

The serum obtained was used in agglutination and precipitin tests. Similar results were obtained with fresh virus or with virus which had become inactive for mice as a result of cold storage.

The agglutination titres of the sera of the immunized g. pigs were relatively high—in the region of 1:320 ; it was not possible to raise the titre above this figure. Virus suspensions, heated at 70°-75°C. for one hour, were agglutinated by g. pig anti-virus serum. Such sera, absorbed with heated antigen, failed to agglutinate heated antigen, but readily agglutinated unheated virus. It appeared that psittacosis virus was antigenically complex, containing a heat-labile and a heat-stable fraction.

Cross agglutination with chick-embryo membrane vaccinia virus showed that psittacosis antiserum was capable of agglutinating vaccinia in a dilution of 1:40.

In order to determine whether psittacosis has any connexion with rickettsia, which closely resembles L.C.L. bodies, the *Proteus vulgaris* agglutination test was used, as in rickettsia, with anti-psittacosis serum ; the results were negative.

Human serum shown to contain complement-fixing antibodies against psittacosis virus failed to agglutinate such suspensions, demonstrating the greater sensitivity of the complement-fixation test in this connexion. Anti-psittacosis serum prepared in rabbits gave a flaky agglutination.

The authors, quoting Merrill [*V. B.* **6**. 744.], assume that 0·001 mg. of antigen per ml., irrespective of particle size, is necessary in antigen-antibody reactions before aggregation is visible with immune sera. On the assumption that the psittacosis elementary body is a perfect sphere with a specific gravity of 1, they calculated that if the average particle diameter is 250 mμ (shown above and by other workers), the mass of such a particle would be $7{\cdot}7 \times 10^{-12}$ mg. They showed experimentally that $2{\cdot}2 \times 10^8$ virus particles per ml. gave a positive agglutination, whereas $1{\cdot}1 \times 10^8$ gave no visible clumping. These experimental figures agree, within the range of experimental error, with the assumption made, giving a mass required for visible reaction in the region of the theoretical 0·001 mg. per

ml. They also support MERRILL's suggestion that the lack of observable reaction may be due to an insufficient mass of antigen.

The supernatant fluid resulting from the first angle centrifugation of psittacosis-infected membranes contained no soluble precipitable substance which could be satisfactorily demonstrated by the technique described. Non-specific flocculation made correct interpretation of the test difficult.

It was not possible to show the presence of neutralizing antibodies in antiviral sera by subsequent growth of test-sera-virus mixtures on egg-shell membranes to demonstrate absence of growth. This is explained by the fact that massive doses of virus are required for propagation on the egg-shell membrane and because neutralizing antibodies, when present, are only so in minute amounts.

The authors believe that the evidence they produce further supports the view that the causal agent of psittacosis is a minute micro-organism, having much in common with bacteria and requiring an intracellular environment for multiplication and survival.—L. E. HUGHES.

ANON. (1940). **Some New Data on the Distribution of Poliomyelitis Virus.**—*Publ. Hlth Rep., Wash.* **55.** 25.

Recent observations on the distribution of the virus of poliomyelitis may have some bearing on the mode of spread of the disease. The virus has recently been demonstrated in sewage. It has also been demonstrated in the stools of healthy controls. Infection is probably by direct personal contact and there is corroborative evidence that the virus is probably spread among the general population by healthy carriers.

NAGANO, Y. (1938). Virus-sérum vaccination contre la fièvre de la Vallée du Rift. **[Serum Virus Vaccination against Rift Valley Fever].**—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 688-690. 1 table. [8 refs.] Amsterdam: Societas Neerlandica Medicinae Tropicae. [In French].

Virus for these experiments was obtained by emulsifying the liver of infected mice, and filtering and drying the filtrate *in vacuo*, the antiserum being made from rabbits or monkeys inoculated with virus at weekly intervals. Using mice as the experimental animals, it was found that serum was valueless if given too soon after infection. The best time to administer the serum varied with the quality of the virus. For virus which killed in 60 hours an interval of 48 hours from infection was satisfactory, whilst for virus killing in 48 hours, the interval had to be reduced to 24 hours.—U. F. RICHARDSON.

ROSENOW, E. C. (1938). **Isolation of Bacteria from Virus and Phage by a Serial Dilution Method.**—*Arch. Path.* **26.** 70-76. 3 figs. [Numerous refs.]

By serial dilution up to 10^{-20} in dextrose-brain agar and dextrose-brain broth, streptococci were cultured from emulsions of 31 different equine encephalomyelitic virus strains. In about 44% of strains, no growth occurred in dilution 10^{-1} when one or more of the higher dilutions yielded streptococci and the number of colonies in each dilution was not proportionate to the laws of dilution. Streptococci were isolated in dextrose-brain agar from 84% of Berkefeld N and Seitz filtrates of 16 equine encephalomyelitic virus strains, whereas all corresponding dilution cultures in dextrose agar, dextrose broth and blood agar were sterile. The viability and virulence of the streptococci from the highest dilution cultures in dextrose-brain agar were greater than of those obtained from the low dilutions. These streptococci were specifically agglutinated by the respective antisera, and

vaccines prepared from them protected horses against epidemic encephalomyelitis, and g. pigs and mice against inoculations of encephalomyelitic virus.

Serial dilution cultures of phage-lysed staphylococci, *Bacterium coli*, *Bact. aerogenes*, *Bact. friedländeri* A and B, and *Bacillus subtilis*, in dextrose-brain agar, in 6 of 18 instances yielded no growth in dilution 10^{-1} when growth occurred in higher dilutions; stainable forms characteristic of the organisms under study were demonstrable in these cultures.—R. O. Muir.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Stewart, W. L. (1939). **The Economic Importance of *Ixodes ricinus*.**—*Vet. J.* **95.** 341-349. 1 table.

S. reports several instances of severe losses, with death rates of up to 80%, when sheep born or reared on clean pastures were transferred to ground infested with *Ixodes ricinus*. In a study of 110 cases of death among lambs on tick infested farms, a staphylococcal pyaemia was the most common condition met with, and it is believed to have been the cause of death in 30 cases. Infection is believed to occur by tick bite.

The possibility of the spread of ticks is discussed, and field experiments on the protection of sheep against infection are described [see *V. B.* **10.** 30]. For protection of adult sheep, a dip containing derris and arsenic had a marked value for two weeks. New born lambs, dusted with a powder containing ground derris root, were found to be protected for approximately two weeks. A derris-containing smear was also used; the tick infestation was reduced, and the smeared lambs showed better health and weight than the untreated controls.—J. MacLeod.

Stewart, W. L., & Ponsford, A. Phyllis. (1939). **The Control of Sheep Ticks.**—*Vet. Rec.* **51.** 1481-1485. 5 tables.

The application of a derris dust to the axillae, head, neck, ears, and chin of ewes and lambs was found to be more efficient in keeping the animals tick-free than dipping solutions. The powder is irritating to mucous surfaces and special care is necessary to prevent the dust from entering the sheep's nostrils and eyes. On one tick-infested farm the lamb mortality was greatly reduced by applying tick control measures (dipping and dusting).

Twenty-five out of 28 unacclimatized sheep placed on a louping ill pasture without protection from ticks, developed temperatures above 106°F., whereas of 14 similar sheep, protected from tick bites by derris powder, only four developed febrile reactions. The drugs uleron and prontosil appeared to shorten the febrile phase.—Walter Moore.

I. Lavier, G. (1938). La lutte contre les glossines. **[The Control of Tsetse Fly].**—*Acta. Conv. tert. trop. malar. Morbis, 1938.* Pt. I. pp. 650-660. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In French: Discussion pp. 660-662]. [Also appeared in *Ann. Méd. Pharm. colon.* **37.** 27-40. (1939)].

II. Harris, R. H. T. P. (1938). **The Control and Possible Extermination of the Tsetse by Trapping.**—*Ibid.* pp. 663-677. 1 table. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In English].

I. This is an excellent short review of the methods which have been adopted for the control and destruction of tsetse fly, by partial or total clearing, trapping and biological methods. It contains little original matter, but great emphasis is laid on the importance of a study of local conditions being made and control

measures in accordance with those conditions by entomologists in co-operation with the forestry, administrative and other officers concerned. In the discussion which followed RODHAIN drew attention to the success obtained by game destruction, and to the danger of pigs in that they attract tsetse into settlements and may be also carriers of *Trypanosoma gambiense*. SEQUEIRA drew attention to the success of tsetse eradication on the Ile du Prince.

II. H. records the results of large scale trapping of *Glossina pallidipes* in Zululand, and discusses the principles on which successful trapping depends, and those which should be followed in trap designs for other species of tsetse fly. He considers that the actual habitat of any tsetse species is not determined by any particular flora, but by the particular degree of lighting which the floral canopy displays, and that, in a successful visual impression trap, it is necessary to provide as nearly as possible the optimum degrees of sunlight and shadow in the trap, to which a particular species most readily responds. It is not possible to maintain these optimum conditions throughout the day, and for this reason the position in which a trap is located plays an important part in making large captures. The making of maximum captures is dependent upon the maximum number of hours during which optimum degrees of shadow and sunlight are exhibited in the body and cage of the trap. The standard trap now used in Zululand is six feet long by three feet wide and three feet deep. The body is covered with hessian, 72 inches in width. There is an opening six inches in width along the whole length of the venter of the body, whilst a similar opening runs transversely across the platform which is surmounted by a cage fitted with a non-return opening. The sides and lid of the cage are bright wire gauze, whilst the wood work is painted white.

Turning to the effects of trapping in Zululand, H. records that large scale trapping started in 1931 when the average daily fly density per trap was 81·1. By 1938 it had fallen to 0·0003. In the latter period of trapping, whilst the majority of traps caught no flies, some traps at wide distances apart caught one fly each. It was concluded that these scattered flies had been carried into the area by game, and an attempt has now been made to control game movements by the use of hessian screens, sufficiently near the ground to prevent the game from seeing under them, and high enough to prevent them from seeing over. No animal, from a wart-hog to a rhinoceros, when unmolested has attempted to go through these screens.—U. F. RICHARDSON.

SYMES, C. B., & SOUTHBY, R. (1938). **The Reduction of *G. palpalis* in a Lake Shore Area by the " Block " Method.** pp. 32. 12 tables, 4 diagrams, 1 map, 3 appendixes. Nairobi: Govt. Printer. [fcp].

An area along the shore of Lake Victoria near the Uganda border was divided up into a number of blocks by clearings made in the wide bays which alternate with rocky headlands. Fly paths were cut through the thick bush of the uncleared headlands and the reduction of *Glossina palpalis* was attempted by hand catching, traps and pupa collection. Hand catching was the most successful and economical method, pupa collection was costly and trapping was ineffective. 30% of the hand-caught flies were females.

The pupal period varied between 43-53 days. The maximum activity occurs from April to June and maximum reproduction from April to September. A considerable reduction of *G. palpalis* was accomplished, allowing about 16 sq. miles to be partially settled. Fly counts made at intervals subsequent to the termination of this work, showed that gradual reinfestation or re-growth was taking place. It is hoped to complete the elimination of *G. palpalis* in the near future. [No indication is given as to how reinfestation will be prevented].—R. FISHER.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

I. Ganslmayer, R. (1939). Rezultati terenskih pokusa sa vapnom, obzirom na djelovanje na metiljskog puža. [**Results of Field Experiments with Slaked Lime in the Control of Liver Fluke Snails**].—*Vet. Arhiv.* **9.** 1-10. 2 figs. [3 refs.] [German summary].

II. Ganslmayer, R. (1939). Umjetna gnojiva koa sredstva za suzbijanje metiljskog puža. [**Use of Artificial Manure in the Control of the Liver Fluke Snail**].—*Ibid.* 269-279. 6 tables. [8 refs.] [German summary].

I. A series of experiments on the destruction of liver fluke snails was carried out, first with copper sulphate [*V. B.* **8.** 708] and, as described in the present article, with slaked lime, and it was found that slaked lime was a very satisfactory agent for this purpose. It should be used either as a powder distributed broadcast (1,000 kg. of powder per hectare) or as a 10% solution (10,000 litres of solution per hectare). It is stated that 80% success may be obtained with the powder and almost 100% with the solution. Better results are obtained in the more marshy places and on bare soil than on soil covered with vegetation. The degree of alkalinity should be not less than pH 11.

Slaked lime should not be used for running water, as the required degree of alkalinity cannot be maintained. Its use can be recommended only for regions where there is both plenty of lime and abundant water.

II. G. searched for cheaper methods for controlling liver fluke snails than the use of copper sulphate or slaked lime and tested the value of artificial manures for this purpose. He found that the snails were killed within 30 minutes by a 1% solution of superphosphate and he suggested that it should be sown broadcast at 300 kg. per hectare, or more on soil with abundant vegetation. He found that a 1% solution of cyanamide killed the snails in 20 minutes and suggested that it should be used at the rate of 400 kg. per hectare. The snails were destroyed by a 5% solution of so-called " 40% potassium salt " in 30 minutes and G. suggested that 400-600 kg. per hectare should be used. It is not suitable for ground with much vegetation.—B. Oswald (Križevci).

Pullar, E. M. (1939). **The Life Cycle of** *Moniezia expansa*.—*Aust. vet. J.* **15.** 71-73. 1 fig. [7 refs.]

This is an annotation referring to previous studies on the life-cycle of *Moniezia expansa* by Curtice, Flattely, Mönnig, Daubney, Seddon, Sinitsin, Scott and Honess, and Stoll. A brief review is given of the recent studies by Stunkard, who found that oribatid mites of the genus *Galumna* could act as intermediate hosts for this cestode.—H. McL. Gordon.

Zakharevich, T. A. (1937). K voprosu epizootologii moniezioza ovets. [**The Epizootology of** *Moniezia* **Infestation of Sheep**].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skryabin.* pp. 792-794. 1 table, 2 charts. Moscow: Lenin Acad. Agric. Sci.

Z. found that *M. expansa* and *M. benedeni* occurred in 2-10% of mature sheep in the Kirov area during the winter. He believes that, had lambs been included in the survey, the percentage would have been higher. The infestation of *M. benedeni* remains at about this level throughout the year. Numerous young forms of *M. expansa* are found at the end of May, and in June the percentage of infection rises sharply, reaching 92·8%. Where lambs are treated for *Moniezia*, Z. urges the necessity for treating sheep also, in order to reduce pasture reinfestation.

COUTELEN, F. (1938). Sur la structure et sur la morphogenèse de la membrane cuticulaire des hydatides échinococciques. [**The Structure and Growth of the Cuticular Membrane of Echinococcal Hydatid Cysts**].—*C. R. Soc. Biol. Paris.* **129.** 149-151. [5 refs.]

The author reviews work done on this subject. He concludes that the cuticular membrane of echinococcal cysts may be regarded as having a mitochondrial origin.—A. L. WILSON.

I. KELLER, H. (1938). Wird durch die Aufbewahrung finnigen Rindfleisches in Kühlräumen die Invasionsfähigkeit der Rinderfinne aufgehoben und an welchem Zeitpunkt? [**The Destruction of Cysticerci in Beef by Cold Storage**].—*Z. Fleisch.- u. Milchhyg.* **48.** 322-325.

II. KELLER. (1938). Versuche über die Abtötung der Rinderfinne durch CO_2-Atmosphäre. [**The Destruction of Cysticerci in Beef kept in an Atmosphere of CO_2**].—*Ibid.* **49.** 43-45. 1 table. [7 refs.]

I. Experiments were carried out to determine the time of refrigeration necessary to render *Cysticercus bovis* uninfective. In one test, 45 *C. bovis* were kept at 0°C. to -0·5°C. Two were still viable after 21 days, and one after 22 days. After 23 days in cold storage all were killed. In a second test 62 cysticerci were kept at 2°-3°C. After 21-24 days, only one or two cysts were viable, but after 25 days none was viable. K. concludes that cold storage of measly beef for 23-25 days is sufficient to render such meat fit for consumption.

II. Cysticerci, carefully dissected out of muscle, were placed in flasks in which the air was replaced by CO_2, the flasks being kept at about freezing point [no fluid, apparently, was present]. All cysticerci survived for seven days, but thereafter fewer and fewer were viable upon testing for evagination in bile, until, by the tenth day, all had been killed. In parallel tests with O_2 all the specimens were dead after 13 days.—M. F. BENJAMIN.

PORTER, D. A. (1939). **Effectiveness of the Swine Sanitation System in Controlling Swine Stomach Worms in the South.**—*Proc. helminth. Soc. Wash.* **6.** 21-23. 1 table.

A survey was carried out on the prevalence and intensity of infestation with *Hyostrongylus rubidus*, *Physocephalus sexalatus* and *Ascarops strongylina* in pigs raised under the " swine sanitation system " described by SCHWARTZ [*V. B.* **5.** 567.] and in pigs not so raised.

P.M. examinations were carried out on 2,164 pigs ; 423 had been raised under the above sanitation system, 274 under conditions of " partial sanitation " and 1,467 without any attention to parasitic control. The incidence and percentage of heavy infestations were markedly lower when the sanitation system had been practised and the partial control led to an appreciable reduction in parasitism. —J. R. LAWSON.

I. SALISCH, H. (1938). Ueber das Verhalten der Jungtrichinen im Herzen. [**Behaviour of Immature Trichinae in the Heart**].—*Inaug. Diss., Berlin.* pp. 34. 9 figs. on 2 plates, 1 table. [Numerous refs.]

II. JENSEN, V., & ROTH, H. (1938). Zur Einwanderung der Trichinenlarve in die quergestreifte Muskelfaser. [**The Migration of *Trichinella* Larvae in Striped Muscle Fibres**].—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 259-268. 6 figs. [8 refs.] [In German].

III. WOLFFHÜGEL, K. (1938). Wieviel eingekapselte Trichenen (Trichinella spiralis) erzeugt ein Muttertier? [**The Number of Encapsulated Trichinae**

Produced by a Female Worm].—*Z. Fleisch- u. Milchhyg.* **48.** 301-302. [3 refs.]

I. The experiments were carried out on mice, rats and g. pigs. The immature parasites in the heart were always found in association with the coronary vessels. They make attempts to enter the heart muscle, but never entirely succeed; it seems that this is due to the small size and form of the myocardial cells and not to the sarcolemma, as was suggested by Sträubli. Since the parasites leave the heart by way of the blood stream, none could be seen 25 days after infestation. No dead parasites were seen in the cellular infiltrations in the heart muscle or in the connective tissue. The cellular infiltration seen in the myocardium seems to be the result of general toxic action as well as of injuries caused by the larvae during their migrations.

II. Six g. pigs were fed with varying doses of larvae and killed from 9-17 days later. Sections were prepared from the masseter, neck and forearm muscles, as these were the most heavily infested. Examination of the sections revealed that the larvae did not increase in size from the time of birth in the intestine till they reached the muscles. After leaving the capillaries in the muscles they burrowed into the fibres and could be seen under the sarcolemma, but none could be seen in the interstitial connective tissue. In some sections the larvae seemed to have been arrested in the process of burrowing into the muscle substance, as the anterior end was buried in the deeper layers while the posterior end was free. The muscle cells did not show any pathological change at this stage and the larvae assumed different positions. At times they appeared to be spirally wound round the primary bundle and at others they were in the shape of the letter U. When the larvae had reached the inside of the fibres they settled down and increased in size, and various structures could be distinguished in their bodies. Pathological changes, such as loss of transverse striation and karyorrhexis, were seen in the muscles surrounding the larvae and these changes made it difficult to ascertain whether the larvae were in or between muscle fibres. About 17 days after the infestation, the larvae commenced to curl up and were then from 400-500μ long.

III. Two encapsulated larvae were fed to each of five white rats. One of the rats was killed about 3½ months later, and 4,608 preparations from its entire muscular system were examined by means of a compressorium in order to ascertain the number of larvae present. The total found was 137 and 15 of these were calcified. They were distributed throughout the muscles as follows :– diaphragm 12, forelimbs 47, pectoral muscles 5, thoracic muscles 20, pelvic muscles 1, abdominal muscles 5, hip muscles 6, hind limbs 18, head 6, spinal and neck muscles 8, and eye muscles 9.—A. L. Wilson.

Roth, H. (1938). Immunitaetsverhaeltnisse bei experimenteller Trichinose. [**Conditions of Immunity in Experimental Trichinosis**].—*Acta path. microbiol. scand.* Suppl. No. 38. pp. 132-136. [In German].

The experiments were carried out on g. pigs. The proportion of larvae found in the muscles to adult parasites found in the intestine was a constant feature, being on an average 1,000:1. A relationship between the initial dose of larvae and the degree of muscle infestation was established. An initial dose of 2,000 larvae was fatal, the animals dying 4-8 weeks later, in the acute muscle stage of the infestation.

In a series of experiments 21 animals, which had survived initial sub-lethal doses of 100, 200, 300, 400 or 500 larvae were given, along with 36 control animals, a test dose of 2,000 larvae. All the test animals lived, whereas 33 of the controls died. The immunity acquired by the test animals was relative to the strength of

the initial dose, for, when the initial dose consisted of from 400 to 500 larvae, very few larvae from the test dose were seen in the muscles; with an initial dose of from 100-200 larvae, the number seen in the muscles from the test dose was considerably greater, and, with an initial dose of only 25-50 larvae, a few of the animals died. The interval between the administration of the initial and test doses of larvae did not seem to be important, and a slight degree of immunity was established 5-11 days after the animals had received the initial dose.

In a further series of experiments g. pigs which had survived initial sub-lethal doses of larvae were given, along with controls, a second dose of from 1,500-2,000 larvae, and both groups of animals were killed a few days later. In the actively immunized animals the parasites had reached the adult stage, but were reduced in size and rapidly disappeared from the intestine after birth of the larvae. They were not seen in the small intestine after the 10th day nor in the caecum after the 15th day, whereas normally they live in the intestine up till the 35th day. Super doses of 6,000, 12,000, and 18,000 larvae killed the immunized animals before their immunity could be effective.

To ascertain if the active immunity was a response to the stimulus provided by the presence of larvae in the muscles, or of adults in the intestine, male and female immature parasites were separated and fed to g. pigs, so that no larvae would be present in the muscles. The dose of females was greater than that of males, and a greater degree of immunity was conferred with the former than with the latter. It was not proved, however, if this was due to the greater number of females used or to some specific characteristic of sex, such as the longer duration of life of the female. R. concludes that immunity is acquired by the host in the intestinal stage of the infestation. Injection of suspensions of powdered larvae conferred only a slight degree of immunity and experiments to produce passive immunity were not successful—A. L. Wilson.

Datta, S. (1939). **Microfilarial Pityriasis in Equines** (*Lichen tropicus*).—*Vet. J.* **95.** 213-222. 11 figs. on 2 plates. [Numerous refs.]

Lichen tropicus (prickly heat) is a disease prevalent during the hot weather in India. It is not contagious but certain animals are prone to it. Treatment is unsatisfactory.

D. describes a microfilaria which he suggests is a cause of the condition; the adult stage could not be found. *Onchocerca cervicalis* was demonstrated in the ligamentum nuchae of several of the cases. The main centre of the activities of the microfilariae appeared to be in the upper layer of the corium and in the papillary body. Around the artery supplying the papillary body, and in the dilated lymphatics, a marked cellular reaction was found, the predominating cells being eosinophiles, and numbers of microfilariae were seen in these areas.—J. R. L.

Mundhenk, R. L., & Greene, J. E. (1939). **Differentiation of Canine Hematozoa.** —*Vet. Med.* **34.** 364-371. 6 figs., 3 tables. [9 refs.]

Examinations of the blood of 50 dogs and of the cadavers of 100 dogs from Alabama and Georgia revealed that infection with *Spirocerca sanguinolenta* is much more common than had been realized. This is important because *Dirofilaria immitis* infestation is likely to be suspected in such cases. Fixed and stained larval specimens may be differentiated on morphological grounds, and a table is given showing average measurements.

Attempts at diagnosis were also made by means of serological tests; whilst intradermal tests were unreliable, precipitin tests appeared to be specific. The

authors question several points in the accepted theory of the life-cycle of *S. sanguinolenta*.—M. L. Bingham.

Galliard, H. (1939). Unicité ou pluralité des *Strongyloides*. [**Specificity and Plurality of *Strongyloides***].—*C. R. Soc. Biol. Paris.* **130.** 413-416.

Since differentiation of the species of the genus *Strongyloides* presents great difficulties, it seems rational to consider the application of biological tests and to study the receptivity of a given host for a given species of parasite. At Tonkin, *S. stercoralis* is common in man but rare in the dog, and G. never encountered it in the cat. The human strain is, however, very pathogenic for young dogs, which are easily infected *via* the skin or, with more difficulty, *per os*. In massive infestations rhabditiform larvae were seen as soon as the seventh day and the animals died about the tenth or 12th day or, if the infestation was light, towards the 20th day, with necrotic lesions of the duodenum. Adult dogs were also encountered in which there was an infestation which lasted for at least two months, but which could be detected only at P.M. examination. The virulence of G.'s strains of the parasite remained unattenuated after six successive passages. The number of larvae found in the faeces was found to be no indication of the degree of infestation. Both types of life-cycle [direct, host to host (parthenogenetic) and indirect, host to outside world to host (bisexual)] were observed in man, but the direct life-cycle was suppressed in the dog after several passages.—A. L. Wilson.

IMMUNITY

Jeaume, G. (1939). La notion de dose en matière de tuberculination hypodermique. [**Tuberculin Dosage for the Subcutaneous Test in Cattle**].—*Maroc méd.* **19.** 195-196.

The earlier reaction to a subcutaneous dose of tuberculin, shown by cattle which have quite recently received a previous dose, is held to be due to the state of the sensitivity of the animal and not to the amount of tuberculin administered at this last test. Intramuscular injection is suggested as an alternative to subcutaneous injection in such retests in order to induce more rapid absorption of tuberculin into the blood-stream.—H. Burrow.

Petragnani, G. (1939). **Proposal for a Standard Method for the Preparation of Tuberculin and of an Anti-Tuberculosis Vaccine.**—*Tubercle, Lond.* **20.** 314-320. 1 table. [12 refs.]

Human, bovine and avian strains of bacilli are used for the production of an integral anatuberculin, a homogeneous emulsion of tubercle bacilli in formalin salt solution, which when injected into healthy g. pigs produces allergy without impairing the health of the animals. This anatuberculin causes a strong local reaction in g. pigs previously treated two or three times with the same product, and when inoculated into tuberculous g. pigs provokes Koch's phenomenon.

The liquid, separated by filtration from the bacillary bodies which were used for the preparation of the integral anatuberculin, has definite diagnostic properties. The titration of this tuberculin for g. pigs and cattle is described.—J. Reid.

Thumann, E. (1937). Die Schnellagglutination nach Diernhofer bei der Feststellung der Bruzellose sowie ein Beitrag zur Bekämpfung der Seuche durch Absonderung und Ausmerzung. [**Diernhofer's Rapid Agglutination Test**

for Brucellosis. Control by Isolation and Segregation].—*Inaug. Diss., Hanover.* pp. 63. 2 figs., 14 tables. [Numerous refs.]

Using between 50 and 150 animals per group T. compared Diernhofer's rapid agglutination test [*V. B.* **7.** 267.] with the tube test with blood and with milk. The agreement was close but 17 out of the 422 animals positive to the tube test with blood were negative to D.'s test. In a group of 32 cows with mastitis the rapid test with milk agreed in every case with the slow tube test with serum. Agreement was also obtained in g. pigs and horses.

A description is given of the control of the disease, by blood testing followed by isolation of infected animals, in a herd in which over 50% of the stock were infected.—P. S. Watts.

Huddleson, I. F., & Pennell, R. B. (1939). **The Preparation and Purification of Brucella Antiserum.**—*Science.* **90.** 571-572. [2 refs.]

The authors have concluded from earlier work that the clinical manifestations of brucellosis in man and animals are probably due to a soluble fraction of the bacillus which is toxic by any parenteral route, and preliminary studies have also shown that this toxic action may be neutralized *in vitro* before injection or by injecting antiserum shortly before the toxic fraction.

Various procedures have been tried for concentration and purification of the fraction, and the only one of value was found to be adsorption on to aluminium chloride, followed by disaggregation of serum proteins by means of pepsin, removal of non-specific proteins by heat coagulation, and finally, precipitation with ammonium sulphate and dialysis against distilled water. [Details are given in the text.] By this means, the precipitation values for the toxic fraction were increased from 1:32,000 (antigen dilution) and 1:40 (serum dilution) to 1:4,000,000 and 1:2,048 respectively in the final product. A protocol is given to exemplify the high *in vivo* neutralizing power of the purified serum in g. pigs. Preliminary trial of the product in human beings has not yet given conclusive results.—A. W. S.

Ramon, G., & Richou, R. (1939). Sur la production rapide d'un sérum anti-staphylococcique de valeur antitoxique élevée. [**Rapid Production of Staphylococcus Antiserum of Antitoxic Value**].—*Rev. Immunol.* **5.** 427-431. 3 tables. [Numerous refs.]

Experiments on a small number of horses showed that serum with an antitoxin titre of 300-600 units could be produced in 17-24 days. The first one or two injections consisted of toxoid, and these were followed by 1-3 injections of toxin. In all cases tapioca powder was mixed with the material to be injected. Horses whose sera contain some natural antitoxin respond much better than horses from whose sera it is absent.—John Francis.

Ciantini, F. (1939). Les composés endotoxiques du B. coli et leur aptitude immunisante. [**Endotoxic Components of *Bacterium coli* and Their Immunizing Capacity**].—*Boll. Sez. ital. Soc. int. Microbiol.* **11.** 9-15. [In French].

After a detailed review of the various toxic substances derived by different investigators from *Bact. coli*, and of their antigenic properties, C. describes his own investigations of the toxicity and antigenic properties of 20 *Bact. coli* strains derived from faeces and pathological tissues, and of the nature of the antibodies produced in the animal serum. Injection of rabbits with filtrates of these strains from four different liquid media failed to demonstrate the existence of a neurotropic exotoxin. Cultures of these strains allowed to autolyse in the incubator

were shown to contain a soluble, filtrable, heat-stable toxic principle similar to the enterotropic endotoxin of other workers. The toxicity of this endotoxin was estimated by injecting white mice with the following different products :– (1) heat-killed suspensions in normal saline ; (2) three filtered products of bacteriolysis, obtained by McFadyan's [? MacFadyen's] technique of repeated freezing and heating, by Besredka's method of grinding dried cultures and by Weinberg's distilled water technique, and (3) the glucido-lipoid fraction obtained by extraction with trichloracetic acid. The products of bacteriolysis were most, and the glucido-lipoid extract least, toxic. The antigenic properties of the glucido-lipoid extract, the heat-killed bacilli and the product of lysis with distilled water were compared by examination of the precipitating, agglutinating, antitoxic and antibacterial powers of the sera of rabbits vaccinated by each method. The precipitin, agglutinin and antitoxin contents of the serum of rabbits vaccinated with the product of bacteriolysis were much higher than those of the other antisera.

—R. O. Muir.

Schütze, H. (1939). **Prophylactic Inoculation During the Incubation Period.** —*Lancet.* **237.** 643-646. 8 tables. [6 refs.]

With a view to obtaining further data on the alleged " negative phase ", S. studied the effect of giving various amounts of vaccine both before and after the infection of groups of mice with a dose of *Salmonella typhi-murium* which killed about 50% of the controls in three weeks. The results showed that certain freshly prepared, heated vaccines, given after infection, appreciably decreased the percentage of survivors.

Stored vaccines had no deleterious effect and improved the chances of survival. Thus, out of 216 mice treated with a vaccine dosage of 6×10^6, the survival rate was 72% at the end of 21 days, as compared with 59% in 120 untreated controls.

With a more severe infection, *viz*, *S. enteritidis* (100% mortality), the average length of life in treated animals was not shortened by the intervention of the homologous vaccine.

These results suggest that it is not necessarily dangerous to inoculate a community during the course of an epidemic. [S. refers more particularly to typhoid outbreaks, but the general principle may hold for other diseases].—R. E. Glover.

Fleming, A. (1939). **Recent Advances in Vaccine Therapy.**—*Brit. med. J.* July 15th. 99-104. 6 tables, 1 chart. [7 refs.]

Oral vaccination is not regarded by F. as a reliable alternative to subcutaneous vaccination, although the oral route is thought worthy of trial where the latter is contra-indicated. In the case of certain vaccines, a small amount absorbed through the alimentary tract may give an effective secondary stimulus where a primary stimulus has already been conferred by subcutaneous vaccination. The important practical problem of antigenic dissociation is stressed with regard to the necessity for preparing stock vaccines from fresh cultures in which the antigens have not degenerated. The introduction of toxoid therapy is recommended as a means of producing an active antitoxic immunity, which can be accurately measured. Active immunization with tetanus toxoid is suggested as a useful prophylactic measure, which would greatly lessen the chance of fatal tetanus, even where antitoxin was not administered.

A study of the antitoxic response of different patients to a course of staphylococcal toxoid, showed that the rise in the antitoxic content of the serum varied with the individual, there being for each a limit beyond which the titre would not go

no matter how much toxoid was given; that after vaccination stopped there occurred a gradual fall in the antitoxin titre, within a year, to 57% of the titre at the end of vaccination; but that the antitoxin titre could be maintained at its height for over a year by 0·5 c.c. doses of toxoid every three months.

In the treatment of local staphylococcal infections, the best results appear to be obtained by vaccination with mixtures of vaccine and toxoid. Reference is made to the protection which SHOPE [see *V. B.* **10.** 516.] obtained in pigs against swine influenza with heat-killed vaccines of the swine influenza bacillus. Mention is also made of the successful protection of experimental animals against human influenza by means of a vaccine prepared from the influenza virus. The synergic action of vaccination and chemotherapy is described as the latest development in connexion with vaccine therapy, and two tables illustrate the synergic action of pneumococcal vaccine and M & B 693 in protecting mice and rabbits against infection with virulent pneumococci.—R. O. MUIR.

THOMSON, S. (1938). **The Effect of Injections of Serum on Haemolytic Complement, with Particular Reference to Bordet's Anti-Immune-Body Effect.**—*J. Path. Bact.* **47.** 395-404. 11 tables. [5 refs.]

In a previous paper, T. showed that the serum of a rabbit previously injected twice subcutaneously with 10 c.c. of normal horse serum lost its ability to lyse sheep red cells sensitized by the addition of a haemolytic immune body prepared in a horse. Tables are here given to illustrate the effect of injections of normal horse serum on the haemolytic complement of the rabbit, the time of onset of complement inactivation, its relationship with precipitins, and the zone phenomenon in the titration of complement of a rabbit so treated.

A comparison was made of the effects of normal and haemolytic horse serum on the complement activity of the serum of a rabbit injected with horse serum. The results of varying the sensitizing dose of haemolytic horse serum were studied and the persistence of the effect of preliminary exposure of sensitized cells to the serum of a rabbit injected with horse serum was determined. The result indicated that it is more difficult to wash red cells free from the proteins of a sensitizing antiserum than from homologous serum. Injection of rabbits with ox serum produced a less marked inactivation of haemolytic complement than that caused by horse serum, while injections of sheep serum had no effect. T. concluded that the phenomenon is due to the fixation of complement by the interaction of proteins of the sensitizing immune horse serum and antibodies present in the injected rabbit's serum, and is the same as Bordet's "anti-immune-body" effect, which could be interpreted in terms of complement fixation.—R. O. MUIR.

WEBSTER, L. T., & HODES, H. L. (1939). **Rôle of Inborn Resistance Factors in Mouse Populations Infected with *Bacillus enteritidis*.**—*J. exp. Med.* **70.** 193-208. 3 text figs., 2 tables. [5 refs.]

In these experiments colonies of varying proportions of specially bred susceptible and resistant mice were placed in cages and infected mice were added. In some cases, after the resulting epidemic had died down fresh mice were added.

Deaths occurred almost exclusively in the susceptible mice regardless of whether they were present in large or small proportions. The so-called infectivity *versus* virulence phenomenon proved to be a manifestation of differences in host resistance rather than in parasite potentialities. It had previously been shown [WEBSTER, L. T. (1930). *J. exp. Med.* **52.** 901-948.] that if hereditary factors were constant, diet exerted a profound effect on epidemics.

There was no evidence that surviving susceptible mice had obtained a specific

immunity. It is concluded that the theory of immunization through subclinical infection has been over-extended, and misleading conclusions have been drawn from the clinical experiment of reinoculating survivors, as this may only be a test of their inherent immunity. [It will be seen that these conclusions differ rather widely from those of Greenwood *et al.* (*V. B.* **6.** 903)].—John Francis.

DISEASES, GENERAL

van der Hoeden, J. (1939). Beroepsinfecties van dierenartsen. [**Occupational Diseases of Veterinarians**].—*Tijdschr. Diergeneesk.* **66.** 219-245. 5 tables. [Numerous refs.] [English, French and German summaries].

Contains the results of an official enquiry into occupational infections, sent to 641 veterinarians in the Netherlands, of whom 218 were practising veterinarians, 231 practising veterinarians who undertook part-time meat inspection duty, and 80 were full-time meat inspectors.

Ringworm had occurred in 103 veterinary surgeons, sometimes repeatedly in the same person. In 98 cases the infection originated from cows, and the disease was nearly always localized on the hands and arms or face. Mange had occurred in 89 veterinarians, in most cases affecting the arms ; 77 had got the infection from cows, seven from dogs and three from horses. The most frequently occurring occupational infection was infection with *Erysipelothrix rhusiopathiae* (the bacillus of swine erysipelas), of which there were 231 cases, in 85 of which the infection recurred. In 88% of these cases infection was contracted from culture used for prophylactic immunization of swine ; in the remaining 12% it was acquired when making P.M. examinations at meat inspection. The disease was nearly always localized on the hands and arms. There had been only six cases of cutaneous anthrax.

Twenty-one veterinary surgeons had contracted cutaneous tuberculosis of bovine origin and six others believed that they had done so (diagnosis not complete). Of the 21, ten acquired the infection in the course of general practice, nine at meat inspection and one from a dog. One veterinarian had tuberculous tendovaginitis in a hand and arm, and was an invalid for five years, and another with a similar affection became a permanent invalid. Four veterinarians sustained a local tubercle, that healed after some months, after pricking themselves while injecting BCG into cattle. There were two cases of acute hypersensitivity to accidental skin contact with tuberculin.

Generalized brucella infection was reported by 15 veterinary surgeons, ten being infected when attending calving cases, one after an operation on a horse and three by an injury while vaccinating cattle with virulent culture. The duration of the disease varied from three weeks to five months. In 168 veterinarians erythema brucellum or pustulous eczema occurred after obstetric work.

One veterinarian infected himself accidentally while engaged in the preparation of vaccinia lymph. Fourteen cases of rabies were reported, but all were saved by vaccination. Glanders and actinomycosis were not reported. Short notes are also given on a few other infections.—Jac. Jansen (Utrecht).

Menon, P. G. (1939). **The Diseases of Elephants.**—*Indian vet. J.* **16.** 94-98.

M. states that the aetiology of many elephant diseases is still obscure and that to understand these ailments, their life and mind should be studied. He briefly discusses eye diseases which may result from direct or indirect causes. Direct injury needs little investigation. Indirect causes may be remote injuries to the

head or optic nerve which usually result from the use by mahouts of unsuitable instruments of correction, or result from conditions of work and life such as (1) working in the sun, (2) working with the tusks, (3) suppressed sexual instincts and (4) unsuitable food. Preventive measures should aim at working the elephants under conditions which most nearly approach their natural way of life, and feeding them on a good variety of natural food.—R. Fisher.

Olsson, E. (1936-1937). Sjukdomar, pälsfel och avelsfel. En översikt, grundad pa insamlat statistikmaterial samt diskussionsmöten landet runt. [**Fur Animal Diseases and Breeding Errors**].—*Vara Pälsdjur*. **7.** 262-265, and **8.** 13-15. [Abst. from translation in *Dtsch. Pelztierz*. **14.** 346-351. (1939)].

The following conditions, as they affect the fur bearing animals bred in captivity in Sweden, are described in a brief and somewhat general manner :– tuberculosis, distemper, meat poisoning, jaundice, anthrax, convulsions, pleurisy, haematuria, haemorrhagic enteritis, lung parasites (the incidence of the lungworm, *Eucoleus aerophilus*, is discussed), hookworms, coccidiosis (said to be increasing), auricular acariasis, defects of fur, breeding irregularities and abortion.

The mink seems to be especially susceptible to TB., commonly contracted through feeding on the offals of affected cattle. The tuberculin test is unreliable in the fox and impracticable in the mink. A condition spoken of as distemper is said to affect all fur animals, but the term is used for a variety of diseases whose ultimate course resembles that of canine distemper. Meat poisoning, usually referred to as paratyphoid, is said to be caused by eating putrid meat or the offals of slaughtered sick cattle, though there is reason to believe that it is not unconnected with bad hygienic conditions. The mortality is very high.—G. Williamson.

Shirlaw, J. F. (1939). **Deg-Nala Disease of Buffaloes : an Account of the Lesions and Essential Pathology.**—*Indian J. vet. Sci.* **9.** 173-177. 6 figs. on 6 plates.

The Deg-Nala, a low-lying tract of marshy riverain land, is one of the largest grazing areas of the Punjab ; it is also a fertile ground for parasitic diseases. The first evidences of " Deg-Nala disease " are general malaise, some abdominal pain and disinclination for movement. The tongue is painful and the anterior part swollen. Subcutaneous oedema of the extremities generally develops. Subsequently dry gangrene and sloughing occur. It appears that a grave systemic disturbance is responsible for the lesions. Histological examination suggests that some irritant has interfered with the nutrition of the arteries through the vasa vasorum, leading to mesarteritis, gross thickening of the vessels and endarteritis obliterans. The lesions are constant ; they include subcutaneous induration by new connective tissue, some mononuclear infiltration and eosinophilia, and attempts to establish a collateral blood supply. An intense invasion of the liver by schistosomes was observed and parasitic atheroma of the aorta was encountered in nine out of eleven cases examined. Feeding experiments yielded no results. It is suggested that this disease may be of helminthic origin.—R. Fisher.

Hole, N. H., & Hulse, E. C. (1939). **The Skin Lesions of Bovine Tuberculin Reactors, Second Report.**—*J. comp. Path.* **52.** 201-221. 25 figs. on 13 plates. [16 refs.] [For first report see *V. B.* **8.** 7.]

Particulars are given of 18 cases examined, tested and autopsied at the Veterinary Laboratory of the Ministry of Agriculture and Fisheries.

The fairly well-established sites of lesions are indicated and it is noted that in their progression, lesions take a centripetal course. The clinical appearance

of lesions is described in detail, three types being described and differentiated. The histology of the three types suggests them to be merely different stages in the development of one pathological condition. The macroscopic and microscopic alterations in the lymph node draining the affected area of skin are set out. Two cases of co-existent tuberculosis and " skin lesions " in the same animal are recorded, although such cases are stated to be rare. Muscle lesions found in one case are described, and differentiation from nodular necrosis of muscle is indicated. Spontaneous absorption of " skin lesions " is stated to be common, but complete disappearance was noted in only one case.

The point of entry of the infective agent has not yet been determined, though injuries to the feet are suggested as possible factors. The response to tuberculin of non-tuberculous animals which show " skin lesions " is reviewed, some reacting to either bovine or avian tuberculin or to both, and others to neither. Any allergy present is noted to be persistent in character. Demonstration of an acid-fast organism recovered from " skin lesions " is reported and its morphology compared with that of the tubercle bacillus. Inoculation experiments gave negative results, as also did cultural tests, and in no case was the laboratory test animal sensitized to tuberculin by previous inoculation with the " skin lesion " organism. The authors are, however, not yet prepared to dissociate this organism from the *Mycobacterium* group. The clinical appearance and histology of skin lesions produced by subcutaneous and intradermal inoculation of bovine and avian tubercle bacilli and the Timothy grass bacillus, are described and compared with those of natural skin lesions, and are found to differ.

A summary is given of cases of " skin lesions " reported from other countries, and they are compared with findings in Great Britain. The negative relationship is noted between bumble foot in poultry and avian tuberculosis in birds failing to react to tuberculin, and a possible relationship between the organism found in cases of bumble foot and that associated with " skin lesions " is suggested.

A lengthy appendix gives a complete, detailed history of both *ante-mortem* and P.M. findings, including reactions to tuberculin tests of the cases of " skin lesions " studied.—H. Burrow.

Fraser, A. C. (1938). **Remarks on an Outbreak of Equine Influenza and Pneumonia.**—*Vet. J.* **94.** 323-327. 3 graphs.

The term " equine influenza " is here used to describe a febrile condition associated with anorexia and tachycardia which was accompanied or followed by pneumonia caused by *Streptococcus haemolyticus equi*. Three studs on the same estate were involved, but only 23 of the 75 horses comprising the studs became infected, and the cases appeared at irregular intervals over a period of seven months. Infected horses in show condition died in a few days, but no deaths took place among young stock running at liberty. An autogenous vaccine appeared to reduce the mortality from 50% to nil. [F. does not tell which of the horses were vaccinated, and as the management of each stud presumably differed, one is unable to assess the value of this observation.] A curious example of what appeared to be natural resistance followed later by infection is described, and an occurrence still more curious—that of a recovered mare which fainted and remained unconscious for nearly two hours during parturition—is recorded.—G. Williamson.

Morgan, E. (1940). **Mouldy Hay a Cause of Broken Wind in Horses and Abortion in Cows and Mares.**—*Vet. J.* **96.** 51-53.

M. believes that the present infrequency of chronic alveolar emphysema in horses may be correlated with the modern system of storing hay in open barns

in which adequate ventilation prevents infection with various moulds. He supports this contention by citing the absence of this disease in Venezuela, where the diet of horses consists solely of pasture grass and maize. A case is mentioned in which a mare aborted the day after having a feed of mouldy hay.—N. J. Scorgie.

Ammann, K. (1939). Das Lungenemphysem des Pferdes und Rindes. [**Pulmonary Emphysema in Horses and Cattle**].—*Arch. wiss. prakt. Tierheilk.* **74.** 348-401. 14 figs., 2 tables. [Numerous refs.]

An important article dealing adequately with the literature and giving the results of observations and experiments on the structure of the lung in the horse and ox with special reference to its elasticity.

Chronic vesicular emphysema in the horse commences as a catarrhal bronchitis and bronchiolitis which produces respiratory distress and is followed by the typical symptoms of emphysema. Treatment is only successful when emphysema has not already developed, but it is extremely important to make an early clinical diagnosis. Emphysema affects first the apical lobe, then the cardiac portion of the diaphragmatic lobe; in very severe cases the inferior and mediastinal edges of the diaphragmatic lobe are also involved. Histologically, there is always evidence of bronchitis and bronchiolitis and an increase in connective tissue. Special attention was paid to the distribution of elastic tissue, which was found to be less in amount in the horse lung than in cattle; in the latter, the elastic fibres were thicker and there was more interstitial connective tissue. The thickness of the pleura was greatest in the dorsal part of the diaphragmatic lobe and least in the apical lobe, the greater thickness being associated with a better developed elastic layer.

Chronic pulmonary emphysema was found to be rare in cattle, only three cases being encountered in eight years. Emphysema in cattle is usually of the acute type and occurs during slaughter. The lungs of cattle slaughtered at the Zurich abattoir (captive bolt followed by pithing and bleeding) very commonly show hypostatic congestion involving the right lung (animals bled while lying on right side) together with a variable amount of emphysema due to aspiration of blood or stomach contents into the bronchi and bronchioles. In some cases air from ruptured alveoli escapes into the subpleural and interlobular connective tissue, causing interstitial emphysema.

Experiments were carried out to compare the elasticity of the pleura and underlying tissue from various regions of the lungs of horses and cattle. A strip of tissue was suspended from a clamp, kept taut by a small weight, and the additional weight required to produce an increase in length of 10%, 20%, 30% and 40% was noted as well as the permanent deformation resulting in each case. The smaller the weight required and the more nearly the strip regained its former length, the greater the elasticity. The apical lobes were found to be least elastic, and the diaphragmatic lobe had the greatest elasticity, the proportion being about 1:4. Similar results were obtained by hanging fixed weights from the strips and measuring the resulting increase in length as well as the permanent stretching. By this method, the lungs of cattle were found in general to be less elastic than those of horses, and in both species the very young animals' lungs were less elastic than those of the adult. The presence of chronic emphysema resulted in a diminution in elasticity. There was no evidence of true senile emphysema.

There appears to be no doubt that in the horse chronic vesicular emphysema is the result of chronic catarrhal bronchitis and bronchiolitis, and its frequency is explained by the well-known susceptibility of horses to bronchial catarrh. Factors contributing to bronchial affections include bad hygienic conditions and the feeding of dusty and mouldy hay.—E. G. White.

MARSH, H., & WILSON, E. P. (1939). **The Mineral Content of the Lungs of Normal Sheep as Compared with that of the Lungs in " Lunger " Disease.** —*Cornell Vet.* **29.** 345-351. 5 tables. [4 refs.]

The lungs of 14 sheep were examined for their ash content and percentage composition of silicon, iron, aluminium, calcium, magnesium and phosphorus. It was found that increased age did not lead to an increase in the amount of minerals in the lungs, but that the percentages of silicon, iron and aluminium were higher in the younger sheep. The percentages of the various elements in proportion to the dry weight of the lungs were as follows :– total ash 4·97, silicon 0·009, iron 0·63, aluminium 0·017, calcium 0·063, magnesium 0·071, phosphorus 0·991. The lungs of 11 sheep with " lunger disease " (? " Jaagsiekte "), or chronic progressive pneumonia, had much greater total dry weights, but the percentage of ash was increased only a little, while the relative proportions of the different elements did not differ significantly. The authors conclude that inhalation of dust is not the cause of the disease.—P. S. WATTS.

BUER, A. W. (1940). Om en hyppig forekommende pigmentasjon av sauelevere. [**A Common Form of Liver Pigmentation in Sheep (Melanosis)**].—*Skand. VetTidskr.* **30.** 1-9. [6 refs.] [Abst. from English summary].

B. describes melanin pigmentation of the liver in Norwegian sheep and states that the condition has not previously been described. The melanin is localized in the peripheral parts of the acini in the form of small granules enclosed within the liver cells and in Kupffer's cells, but not in the interstices. In the autumn of 1939 it occurred in about 1·9% of slaughtered sheep in a part of Norway, but the incidence appears to vary greatly from year to year. The condition does not appear to be hereditary, nor is it confined to certain districts, nor to certain pastures. The cause of the condition is unknown.

VAN VLOTEN, J. M. (1936). Onderzoekingen over de pathogenese van de " groote bleeke nieren " van het rund. [**Pathogenesis of Large White Kidneys in Cattle**].—*Thesis, Utrecht.* pp. xii+206. 19 figs. on 10 plates, 4 tables. [Numerous refs.]

In the first 73 pages the author gives a general classification of nephritis. He describes more particularly glomerulonephritis in man and cattle and amyloid nephritis in man. He describes in detail 44 cases of large white kidney in cattle and four in calves. The characteristic histological appearance of large white kidneys is a hyaline-amyloid degeneration of the glomeruli and tubules together with some degree of interstitial nephritis. It appears that the condition is an intoxication causing generalized amyloid degeneration of many tissues. From an examination of the kidneys of the four calves, as well as those of other calves, the author supposes that the interstitial nephritis occurs primarily and before the amyloid degeneration is evident.

He was unable to make any distinction between Nieberle's chronic glomerulonephritis and renal amyloidosis. [See also HJÄRRE (*V. B.* **4.** 670.) and ANDERSSON (*V. B.* **7.** 129.)]—JAC. JANSEN (UTRECHT).

SNIEČKIENE, P. (1937). Ériuku paralyžius arba paraplaegia enzootica. [**Paraplegia of Lambs**].—*Vet. ir Zootech., Kovno.* **14.** 199-207. [7 refs.]

Enzootic paraplegia of lambs bred from imported sheep was prevalent in Lithuania in 1937. The illness is progressive and lasts from about four days to three weeks. The chief P.M. findings are :– pale, flecked skeletal and heart muscles, renal congestion, degeneration of the liver and catarrh of the respiratory and digestive tracts. The cause is unknown.—A. PABIJANSKAS (KAUNAS).

Ten Thije, J. (1937). Twee gevallen van linitis plastica bij den hond. [**Two Cases of Linitis Plastica in the Dog**].—*Ned. Tijdschr. Geneesk.* **81.** 5750-5752. [Abst in *Amer. J. Cancer.* **36.** 135, copied *verbatim.* Signed: Edward Herbert, Jr.]

Two identical cases are reported of linitis plastica in dogs. The entire stomach wall was thickened up to 3 cm. and the regional lymph nodes were enlarged. Microscopic examination showed no signs of carcinoma, but only a chronic inflammatory process. One similar case was found in the literature. It is stated that since the gastric mucosa of the dog is similar to that of man, all cases grossly diagnosed as linitis plastica need not be carcinoma; some may be of inflammatory origin.

Uehlinger, E., & Krupski, A. (1938). Renaler Zwergwuchs beim Kalb. [**Renal Dwarfism in a Calf**].—*Schweiz. med. Wschr.* **68.** 1421.

A 13-month-old dwarf calf was examined P.M. There was marked shortening of the long bones and chronic interstitial nephritis. The bony deformity was due to failure of endochondral and periosteal ossification. It is suggested that the renal changes may have caused the skeletal abnormality, as is the case in one form of renal dwarfism in man. Crystals of calcium salts were present in the renal collecting tubules, and small calculi in the renal pelvis.—E. G. White.

Härtl, J. (1938). Die Vererbung des Kryptorchismus beim Hund. [**Inheritance of Cryptorchidism in Dogs**].—*Kleintier u. Pelztier.* **14.** No. 1. pp. 45. 2 figs., 3 tables. [Numerous refs.]

H. studied the pedigrees of 55 litters of German " Boxers " among which cases of cryptorchidism occurred, and of 28 litters of the same breed free from this abnormality. The results suggest that the condition is probably inherited as a simple recessive character and, within the breed examined, can be traced to a few particular animals which have played a considerable part in its development. The eradication of the abnormality is possible only by strict exclusion of affected animals from stud use, and enquiries into the previous breeding history of all stud dogs and bitches with a view to excluding any with evidence of cryptorchidism in their pedigree.

This investigation was carried out at the instigation of breeders of " Boxer " dogs on account of the alarming rise in the incidence of cryptorchidism in this breed during recent years. During the same period the incidence in Germany in other breeds has also increased.—E. G. White.

Fell, Honor B., & Grüneberg, H. (1939). **The Histology and Self-Differentiating Capacity of the Abnormal Cartilage in a New Lethal Mutation in the Rat** (*Rattus Norvegicus*).—*Proc. roy. Soc.* Ser. B. **127.** 257-277. 16 figs. on 3 plates, 2 tables.

In a previous communication one of the authors described a new recessive lethal mutation in the rat which produces a variety of anomalies in various parts of the body, the primary change in each case being the formation of abnormal cartilage in all parts of the skeleton. The two main pathological changes in the cartilage are formation of thick capsules around the chondroblasts and very active proliferation and chondrogenesis in the perichondrium. When such abnormal cartilage is explanted *in vitro*, it survives for about 12 days and the abnormality progresses little, if at all, during cultivation. When normal cartilage is implanted subcutaneously in rats with the lethal gene, it grows well but remains normal. Implantation of the abnormal cartilage subcutaneously in normal rats is followed

by vigorous growth and further abnormal development, the latter progressing beyond the stage which is possible during the short life of rats affected with the lethal mutation. It is considered that the gene acts directly on the chondrogenic cells.—E. G. WHITE.

RHODES, A. J., & VAN ROOYEN, C. E. (1939). **An Infective Disease of Uncertain Aetiology in a Laboratory Stock of Rats.**—*J. Path. Bact.* **49.** 577-579. 10 figs. on 1 plate. [5 refs.]

The authors record a peculiar epizootic which began as an arthritis of one or more joints of a limb or tail. Failing early resolution, a variety of lesions occurred, the most characteristic of which were the formation of a line of demarcation followed by gangrene and sloughing of the limb. The mortality was low. No organisms were isolated ; a disease process was set up in three rats by the inoculation into a joint of material from naturally infected joints. It somewhat resembled ectromelia and *Haverhillia multiformis* [Actinomyces muris] infection of mice.—R. FISHER.

GAUS, O. (1939). Leukose des Gesäuges beim Schwein. [**Leucosis of the Mammary Region in Sows**].—*Dtsch. tierärztl. Wschr.* **47.** 340-342. [Numerous refs.]

G. describes a case of lymphatic leucosis of a sow, found at slaughter. He emphasizes the fact that, in addition to the usual lesions, the mammary region was severely affected. He was unable to find trace of more than one or two such cases in the literature, and suggests that this is due to the fact that the percentage of sows affected with leucosis has always been very small.—P. S. WATTS.

I. DODDS, E. C. (1938). **Cancer Research. The Past and the Future.**—*Lancet.* **235.** 351-355. 8 figs. [15 refs.]

II. GYE, W. E. (1938). **Some Recent Work in Experimental Cancer Research.**—*Brit. med. J.* March 12th. 551-554.

III. CRAMER, W. (1938). **On the Origin of Cancer.**—*Ibid.* April 16th. 830-834. 1 diagram. [16 refs.]

IV. —. (1938). **The Origin of Cancer.**—*Ibid.* 855-856.

V. PYBUS, F. C., & MILLER, E. W. (1938). **Hereditary Bone Tumours in Mice.**—*Ibid.* June 18th. 1300-1301. 2 figs.

VI. —. (1938). **Cancer and Heredity.**—*Ibid.* 1317-1318. [15 refs.]

I. This is principally a review of the present position with regard to cancer, prefaced by a short history of cancer research. D. also indicates what seem to him promising paths of investigation. He states that comparatively few advances have been made by persons who set out in the first instance to conduct cancer research, and is of the view that the most hopeful way of attacking cancer is indirect, *i.e.* by developing general research in the basic sciences of chemistry, physics, botany, physiology, biochemistry and pathology.

II. The aetiology of cancer is considered under two main headings, remote causes and proximate causes, thus distinguishing between the causes leading up to the occurrence of a tumour and those which explain the property of the malignant cell. Included under remote causes are the numerous carcinogenic agents, our knowledge of which has robbed cancer of much of its " mystery ". The proximate cause, however, still provokes the keenest discussion and in this paper G. confines his attention to the view that a virus may be the proximate cause. He refers to the mode of action of a tumour virus, to FOULDS's work with non-filtrable dibenzanthracine tumours, to ROUS's work on the Shope papilloma and finally to the relation between carcinogenic agents and viruses.

III. The underlying theme of this paper is the need for educational propaganda among the medical profession to establish the fact that cancer is largely preventable. Cancer is not a sudden disease, but it is preceded by a long period of induction, occupying a considerable proportion of the span of life of the species. During this precancerous stage the tissue in which malignancy eventually develops undergoes definite pathological changes which may be recognizable clinically.

IV. This is an editorial article emphasizing the chief points made in II and III.

V. From a pair of Simpson strain mice, more than 5,000 descendants were bred with a general incidence of mammary carcinoma of over 50%. Sarcomata rarely occurred, but after four years' breeding six cases appeared. In order to increase the sarcoma incidence these were used for breeding and from a double-sarcoma pairing the incidence reached over 50%, the tumours reproducing many of the bone lesions known in man. It is now hoped to investigate the proximate cause and possibly other problems of bone tumours.

VI. An editorial article dealing with the influence of heredity on cancer. Reference is made to experiments with spontaneous mammary cancer in mice and it is stated that all that can be deduced from them is that the susceptibility to cancer of the breast in mice is determined by chromosomal factors. The incidence, however, is influenced by extra-chromosomal factors and these may be transmitted either in the cytoplasm of the ovum during intra-uterine life or by the mother's milk. The work of CRAMER and HORNING describes how mice, which were highly susceptible to cancer, showed evidence of endocrine imbalance and remained cancer-free after treatment with hormones antagonistic to oestrin.—G. O. DAVIES.

DUPIN, F. (1939). Le cancer chez le chien. Etude anatomopathologique. [**Cancer in the Dog**].—*Thesis, Toulouse*. pp. 137. [Numerous refs.]

This monograph consists of a compilation of the principle facts concerning cancer in the dog extracted from over 300 publications, the references to which are given. The evidence shows that cancer is most common in the female and that the organs most frequently affected are the mammary gland, the skin and the thyroid gland, secondary lesions being very frequent in the heart, the liver and the lungs. Epitheliomata are more common than sarcomata and two tumours, carcinoma of the anal glands and " Sticker's sarcoma " (infectious sarcoma) are peculiar to the dog. D. is of the opinion that parasitism and chronic inflammatory conditions predispose to cancer.—GWILYM O. DAVIES.

I, II & III. CASEY, A. E. (1939). **Distribution of Metastases in the Brown-Pearce Tumour. I. In Standard Breeds of Rabbits. II. Effect of Fifteen Years of Transplantation. III. Effect of Homologous Material.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 223-234. 4 tables. [10 refs.]

IV. CASEY, A. E., & PEARSON, B. (1939). **Distribution of Metastases in the Brown-Pearce Tumour. IV. Effects of Sites of Inoculation.**—*Ibid.* 234-237. 2 tables. [4 refs.]

V. PEARSON, B., & CASEY, A. E. (1939). **Distribution of Metastases in the Brown-Pearce Tumour. V. Comparison with Certain Tumours in Man.** —*Ibid.* 238-241. 4 tables. [12 refs.]

I. During studies on the transplantation of the Brown-Pearce tumour into the testicle of the rabbit certain variations were noted between standard breeds of rabbits. These variations included :– (a) the incidence and volume of the primary tumour; (b) the incidence, volume and number of metastases, and (c) the longevity and the mortality of the animals after inoculation. The rabbits

inoculated were of the same sex, approximately the same age, all in good health, and the diet and housing were similar. The variations noted in the breeds could not be explained on any of these bases therefore and the differences noted appeared to be due to inherent differences in the susceptibilities of the breeds used. The results are here recorded of an effort to determine whether the differences between the breeds were influenced by a selective liability of certain organs and tissues to metastatic involvement.

The number of metastatic foci encountered are tabulated and also the number which might be expected to occur if the distributions were due to chance. The actual and the expected values agree, indicating that there was no selective organ liability and that the breeds were affected equally by the unusual distribution of metastases.

II. Successive monthly transplants over a period of 15 years into a variety of rabbits caused no change in the relative distribution of metastases.

III. C. showed [(1932). *Proc. Soc. exp. Biol., N.Y.* **29.** 816; (1934). *Amer. J. Cancer.* **21.** 760.] that a preliminary injection with a saline emulsion of B.-P. tumour tissue, which had been kept frozen for ten days or longer in an anaerobic state, rendered the inoculated rabbits more susceptible to subsequent transplantation with this tumour; the incidence and volume both of primary tumour growths and of the metastases were affected. This material, when injected, in itself caused no obvious lesions and had no apparent effect on the animal injected.

It is shown that a preliminary treatment with this homologous material caused no change in the relative distribution of metastases following transplantation of the B.-P. tumour.

IV. Observations on the metastatic distribution in rabbits receiving the B.-P. tumour intracutaneously showed that there was no difference in the constant and characteristic distribution of the distant metastases resulting from transplantation by this route, compared with the distribution of such metastases seen in rabbits receiving the tumour intratesticularly. The spread of the tumour by tissue spaces and lymphatic channels was influenced by the site of inoculation.

V. The distribution of metastases in four human tumours is compared with the distribution of metastases from the B.-P. tumour in rabbits. The data for the carcinomata compared with the B.-P. tumour were derived from a total of 1,214 cases.

The human tumours compared were primary in cervix, breast, prostate and rectum, and the sites of metastases selected for comparison were liver, lungs, kidneys and spleen.

The results indicated:– (a) an unusually high and significant incidence of metastasis to the kidney in animals affected with the B.-P. tumour and a relatively low incidence of metastasis to the kidney in all four human tumours; (b) an unusually low incidence of metastasis to the liver in the B.-P. tumour of the rabbit and a relatively high incidence of metastasis to the liver in carcinoma of the cervix and rectum; (c) an unusually high incidence of metastasis to the lung in carcinoma of the prostate and a probably significantly low incidence of metastasis to the lung in carcinoma of the cervix, and (d) a relatively high incidence of metastasis to the spleen in carcinoma of the cervix.—L. E. Hughes.

Lush, Dora. (1939). **The Serological Relationship of Myxoma and Shope's Fibroma Viruses.**—*Aust. J. exp. Biol. med. Sci.* **17.** 85-88. 2 tables. [7 refs.]

Using serial dilutions of myxoma virus, L. was able to demonstrate inactivation of this virus with fibroma antiserum, both by rabbit inoculation and cultures on

the chorio-allantoic membrane. The immunological relationship of these two viruses was also demonstrated by complement-fixation tests using myxoma antigen with myxoma and with fibroma antisera. When non-infective Seitz filtrates of myxoma were used, complement fixation was obtained with myxoma antiserum but not with fibroma antiserum.—W. I. B. Beveridge.

Cloudman, A. M. (1939). **A Transferable Liver Neoplasm (C 198) Arising in a Female Mouse of the Leaden Strain.**—*Amer. J. Cancer.* **36.** 578-580. 3 figs. [Author's summary copied *verbatim*].

1. A transferable liver tumor, which occurred spontaneously in the leaden stock, is described.

2. It is rapidly growing, metastasizes widely, invades surrounding tissue, and results in the death of the host.

3. It appears to have originated from the reticulo-endothelium of the liver and is probably a reticulo-endothelioma.

4. It has been transferred for twelve tissue generations by means of subcutaneous injections of liver from positive animals.

Andervont, H. B. (1939). **Studies on Some Possible Causative Factors of the Spontaneous Adenomatous Lesion of the Stomach in Mice of Strain I.**—*Publ. Hlth Rep., Wash.* **54.** 2085-2093. 7 figs. on 4 plates, 3 tables. [6 refs.] [Author's summary copied *verbatim*].

The adenomatous stomach lesion which occurs spontaneously in strain I mice did not occur in mice of other strains when they were kept in pens with strain I mice or when they were fed the lesion. Feeding tissues of the lesion to young strain I mice did not hasten its appearance or increase its degree of development in the young animals. It is concluded that the stomach lesion is not communicable and is not, apparently, caused by an infectious agent.

The lesion did not regress in older strain I mice fed a vitamin A rich diet and occurred in young strain I mice fed a diet rich in vitamin A. It is concluded that the lesion is not the result of vitamin A deficiency.

The lesion was more pronounced in young strain I mice kept on a dog chow diet which contained roughage than in those fed diets rich or deficient in vitamin A but which contained very little roughage. This suggests that the physical state of the diet may exert some influence upon the development of the lesion.

The vitamin A deficient diet caused hypertrophy and hyperkeratosis of the lining in the forestomachs of mice from three inbred strains but the strains varied in their responses to the deficient diet. The implication of this variation in response is discussed and it is suggested that inbred strains of mice may be of some use in the study of vitamins.

NUTRITION IN RELATION TO DISEASE

Eden, A. (1939). **Trace Elements in Nutrition and Disease.**—*J. clin. Res.* **25.** 45-57. [Numerous refs.]

This is a general review, primarily of veterinary interest, of the role in health and disease of copper, cobalt, fluorine, iodine, manganese, molybdenum and selenium. [See also *V. B.* **9.** 415].—J. E.

Belschner, H. G. (1939). **Toxaemia of Pregnancy in Ewes.**—*Agric. Gaz. N.S.W.* **50.** 355-357 and 376.

B. discusses current theories regarding the aetiology of pregnancy toxaemia. —M. C. Franklin.

Fraser, A. H. H., Godden, W., Snook, L. C., & Thomson, W. (1939). **Ketonaemia in Pregnant Ewes and its Possible Relation to Pregnancy Disease.**—*J. Physiol.* **97.** 120-127. 3 tables. [1 ref.]

Ninety aged ewes (greyfaced breed), divided into seven groups and individually fed, were used in experiments concerning the relation between food intake and the onset of ketosis in pregnancy.

Barren ewes kept on a sub-maintenance ration for three months did not exhibit any symptoms of ill-health, nor did they become hypoglycaemic or ketonaemic, nor lose appetite when, at the end of this period, a two days' fast was imposed. Ewes fed to over-fatness and kept in close confinement throughout gestation did not exhibit symptoms of ill-health up to the end of the gestation period, but partial loss of appetite was observed near term, and those ewes carrying more than one lamb became ketonaemic, although this ketosis had no harmful effect. Pregnant ewes kept during gestation on a basal ration, quantitatively inadequate to permit of reasonable increase in body weight, became hypoglycaemic and ketonaemic. Where no supplements were added to the ration the ketonaemia became progressively worse until death or term. Marked hypoglycaemia or ketonaemia did not necessarily produce symptoms of ill-health, but ketonaemic ewes carrying more than one lamb, tended to lose appetite, this being followed by a rapid increase in the degree of ketonaemia and loss in body weight. In eight animals, this loss of appetite was succeeded by coma and death. Autopsy revealed emaciation, multiple pregnancy and fatty infiltration of the liver.

Hypoglycaemic, ketonaemic ewes receiving additional food in the last 2-4 weeks of gestation, showed a rapid improvement in condition, the blood-sugar level returning to normal, ketone bodies disappearing from the blood, and a normal parturition taking place. The value of the supplementary feeding appeared to be entirely dependent on its caloric value since starch, when readily eaten, was just as efficient in effecting improvement as flaked maize or a protein-rich meals mixture.

The significance is discussed of these experimental results in relation to field outbreaks of pregnancy disease in sheep.—R. Allcroft.

Barker, S. B. (1940). **Effects of Increased Metabolism on Ketosis of Depancreatized Dogs.**—*J. Physiol.* **97.** 394-407. 5 tables. [Numerous refs.]

In order to test the quantitative production of acetone from fat, dogs were depancreatized and the metabolism of endogenous fat was accelerated by exercise or by the administration of dinitrophenol. Analyses of the urine were made and the basic metabolic rate determined. Although an increased oxidation of fat was proved from the B.M.R. determinations, a correspondingly increased ketonuria did not follow, in fact in some cases a decrease in the excretion of ketone bodies was observed.—J. A. Nicholson.

Myers, V. C., & Muntwyler, E. (1940). **Chemical Changes in the Blood and their Clinical Significance.**—*Physiol. Rev.* **20.** 1-36. [Numerous refs.]

This review deals entirely with the significance of chemical changes in human blood under various conditions of disease, and its direct applicability to problems of essentially veterinary interest is thereby somewhat limited. The blood constituents considered are blood volume, blood proteins including haemoglobin and serum proteins, N.P.N. and urea, uric acid, creatinins, guanidine, sugar lipides, pigments, acid-base balance and mineral constituents including Na, K, Ca, Mg, Cl, P and SO_4, and phosphatase. Each section is adequately discussed and those

interested in comparative aspects of biochemical disease problems should find the article of great interest. An extensive bibliography is given.—Alfred Eden.

Sjöberg, K. (1939). Der Gehalt des Blutes an Phosphorverbindungen und Cholesterin bei der puerperalen Hämoglobinämie des Rindes. [**Phosphorus and Cholesterin Content of the Blood in Puerperal Haemoglobinaemia in Cattle**].—*Skand. Arch. Physiol.* **81.** 42-50. 4 tables. [7 refs.] [In German].

Observations, largely in tabular form, are recorded for 22 cows. Plasma inorganic P of affected cows was very low in comparison with that of normal cows at the same post-parturient period; the corpuscular inorganic P was low in some cows and normal in others; the corpuscular organic P varied widely. The blood lecithin and cholesterin were normal.

Analysis of hay fed to these affected cows showed it to be low in P and high in Ca.—J. E.

Duthie, D. W. (1939). **Mineral Deficiency and Cattle Raising in British Guiana.**—*Agric. J. Brit. Guiana.* **10.** 194-204. 5 tables. [16 refs.]

This article deals with mineral deficiency in the pastures as a limiting factor to cattle raising in the savannah lands of British Guiana. These regions constitute the greatest area of the country, but cattle grazing is practically restricted to creeks and river beds, which form only a very small proportion of the total area. If cattle are kept on the higher lands for any length of time they rapidly lose condition and die. Analyses of the pastures have shown that they are even more deficient in lime and phosphates than those of similar areas in Kenya, South Africa, etc. Treatment of the pastures with fertilizers or the regular feeding of bone-meal supplements would in most cases be too costly owing to the inaccessibility of the districts and the high cost of transport. In addition, before the animals reach Georgetown market they must be driven through 180 miles of forest or bush in which the grazing is too limited to provide more than a starvation ration. For these reasons, D. concludes that the higher savannah lands are valueless for grazing, and that owing to the extreme deficiency in lime and phosphate, intensive stocking or livestock improvement is impossible. In the coastlands the grasses show a much higher mineral content, but here stock raising is handicapped by flooding during the wet season, which renders much of the good grazings useless for a long period of the year. The analyses of the grasses for CaO, P_2O_5 and nitrogen are given in four tables; a fifth table gives similar analyses for Kenya, U.S.A., South Africa, Falkland Islands and poor hill pasture in Great Britain. [See also *V. B.* **2.** 416].—N. J. Scorgie.

Corner, H. H. (1939). **Pine Disease in Sheep.**—*Agric. Progr.* **16.** 181-187. [14 refs.]

C. again puts forward the thesis that pine disease in sheep is essentially a nutritional anaemia, curable by daily administration of small quantities of Co. Figures are quoted to show the extent to which " pine " has been reduced in the Scottish Cheviot regions following Co therapy while details are given of suitable mineral mixtures for supplying Co under practical conditions. [Relevant papers on which this thesis is based have already been abstracted in this *Bulletin* (*V. B.* **9.** 882, and **10.** 117.) and the criticisms then advanced are also applicable to the present paper].—Alfred Eden.

Aubel, C. E., & Hughes, J. S. (1937). **The Effect on Growing Pigs of Rations Containing Different Levels of Phosphorus in the Absence of Vitamin D.**—*Proc. 30th Amer. Soc. Anim. Prod. 1937.* pp. 334-340. 1 table. [7 refs.]

The effects are described of feeding three different levels of phosphorus, 0·24,

0·51 and 0·75%, for 22 weeks to three small groups of young pigs which had no access to sunshine or cod-liver oil, but which were on the same level of Ca, 0·79%.

The pigs which received a ration containing 0·51% P and 0·79% Ca, *i.e.* a P:Ca ratio of 1:1·5, had the best appetite, made the best gain in weight and had the best utilization of feed and formation of bone.—R. Allcroft.

Dodds, G. S., & Cameron, Hazel C. (1939). **Studies on Experimental Rickets in Rats. III. The Behaviour and Fate of the Cartilage Remnants in the Rachitic Metaphysis.**—*Amer. J. Path.* **15.** 723-740. 12 figs. on 2 plates. [10 refs.] [For parts I and II, see *V. B.* **9.** 266].

A study of the bones of albino rats, 31 with active rickets, 68 in various healing stages and 26 healthy animals showed that the fate of the cartilage remnants in the rachitic metaphysis was as follows:– (1) much osteoid tissue was deposited on the surfaces of the cartilage remnants, bringing about osteoid envelopment of cartilage; (2) osteoid infiltration of cartilage occurred by the deposition of osteoid tissue in opened lacunae near the surfaces of the cartilage remnants by the osteoblasts which enter the opened lacunae from the adjacent marrow; (3) cartilage cells farther below the surface of the remnants underwent rejuvenation; many of them divided mitotically and assumed the form of osteocytes: while this change was occurring, uncalcified osteoid matrix was deposited about them in the unopened lacunae thus causing an internal osteoid reorganization of cartilage, and (4) in this internal reorganization process the cartilage cells underwent a metaplasia into osteocyte-like form, but the matrix of the cartilage was not changed; it persisted, to become calcified during the healing of rickets and to serve as a base for the deposition of bone in the formation of the trabeculae of the restored bone.—R. A.

Krupski, A., Uehlinger, E., & Almasy, F. (1938). Abnorme Gliedmassenstellungen bei einem Ochsen der Braunviehrasse. Untersuchungen über den Kalzium-Phosphorstoffwechsel und histologische Knochenbefunde. VI. Mitteilung. [**Abnormal Limb Postures in Swiss Brown Cattle. Calcium-Phosphorus Metabolism and Histology of the Bones. VI.**]—*Schweiz. Arch. Tierheilk.* **80.** 543-552. 7 figs., 2 tables. [See also *V. B.* **9.** 797].

The condition described is quite common in this breed. An 18-month-old affected bullock was observed for one year. At the beginning of the observation period the head was abnormally large, the carpal and tarsal bones enlarged, and the metacarpal bones thickened. The serum was high in calcium and low in phosphorus, the calcium:phosphorus ratio being half the normal value. At the end of the year the appearance of the animal was much improved, and the calcium and phosphorus contents of the serum were normal, although a high figure was obtained for serum phosphatase. Histologically the thyroids, thymus, adrenal glands, and ossification in the long bones were normal.—A. T. Phillipson.

Terache, P. (1939). Ossification normale et rachitisme. Lésions précoces du rachitisme. Quelques suggestions concernant sa pathogénie. Lésions précoces du rachitisme chez le poussin. [**Normal Ossification and Rickets. Early Lesions in Rickets in Chicks. Suggestions on Its Pathogenesis**].—*Ann. Méd. vét.* **84.** 449-461.

T. suggests that the pathogenesis of rickets can be explained by postulating a hypothetical cellular deficiency arising as a result of fatigue of the reticulo-endothelial system, and causing a metaplasia of the bone-forming elements. The

fatigue of the R.E.S. may be caused by alimentary auto-intoxication, variations in foodstuffs, or chronic bacterial or parasitic infestations. No experimental data are given.—N. J. Scorgie.

Rich, A. R., & Hamilton, J. D. (1940). **The Experimental Production of Cirrhosis of the Liver by Means of a Deficient Diet.**—*Bull. Johns Hopk. Hosp.* **66.** 185-198. 6 figs. on 2 plates. [8 refs.] [Authors' summary copied *verbatim*].

Cirrhosis of the liver, of a type resembling Laennec's cirrhosis in man, occurred in all of 14 rabbits kept from 25 to 113 days on diets supplemented by various vitamins, but lacking yeast. The present evidence indicates that the cirrhosis was due to the lack of some factor contained in yeast, but different from vitamins B_1, B_2, B_6 and nicotinic acid. Ascites occurred in seven of the animals. Microscopic formed gall stones developed in the intrahepatic bile ducts in two animals.

Nelson, A. A. (1939). **Hemorrhagic Cortical Necrosis of Adrenals in Rats on Deficient Diets.**—*Publ. Hlth Rep., Wash.* **54.** 2250-2256. 4 figs. on 2 plates, 3 tables. [6 refs.] [Author's summary copied *verbatim*].

The hemorrhagic cortical necrosis of the adrenals and other lesions found in rats on diets deficient in some fraction of the vitamin B complex are described.

The panmyelophthisis which Györgi et al. found to occur together with hemorrhagic necrosis of the adrenals in a large proportion of their rats was found in only one rat in this series, and this animal had no adrenal lesions.

Daft, F. S., & Sebrell, W. H. (1939). **Hemorrhagic Adrenal Necrosis in Rats on Deficient Diets.**—*Publ. Hlth Rep., Wash.* **54.** 2247-2250. [3 refs.] [Authors' summary copied *verbatim*].

We have observed extensive hemorrhagic necrosis of the adrenal glands of rats on deficient diets. The condition appears to be due most probably to a deficiency in some unidentified dietary factor. These animals have not shown the purpura or bone marrow changes reported by other investigators in rats on diets deficient in various factors of the vitamin B complex.

It appears unlikely that the hemorrhagic adrenal necrosis is part of the syndrome described as panmyelophthisis, although there is not sufficient evidence to prove conclusively that the two conditions are entirely unrelated.

Hogan, A. G., & Parrott, E. M. (1940). **Anaemia in Chicks Caused by a Vitamin Deficiency.**—*J. biol. Chem.* **132.** 507-517. 2 figs., 4 tables. [Numerous refs.]

Chicks which received a ration containing all the well recognized vitamins and, in addition, a 95% alcohol extract of liver, grew slowly and became anaemic; the anaemia was not due to fasting. The red blood cell count, the percentage of haemoglobin in the blood and the red cell volume were decreased, although the amount of haemoglobin per cell was increased. It was found that in these anaemic chicks the red blood cells were larger than is normal and the volume of individual cells was increased; they were also less fragile than is normal, but the blood clotted within normal time. The anti-anaemic agent could not be identified with any vitamin previously described, and for convenience it is designated in this paper as Bc, as it belongs to the old vitamin B complex, the small " c " being added because this substance is essential for the chick.—R. Allcroft.

MADSEN, L. L., & DAVIS, R. E. (1938). **Spectrophotometric Examination of Cattle Blood for Carotene and Vitamin A.**—*Proc. 31st ann. Meet. Amer. Soc. anim. Prod. 1938.* pp. 327-332. 2 tables, 3 graphs.

A report is given of some absorption characteristics and initial data on the amounts of carotene and vitamin A found in the blood plasma of some beef and dual purpose cattle under conditions of normal feeding practice and also when receiving a limited amount of carotene from alfalfa or vitamin A from cod liver oil. The data show that low blood carotene was associated with low blood vitamin A, and when carotene was fed at the rate of 60 γ and 30 γ per kg. of body weight daily, both the plasma carotene and vitamin A increased with a relatively greater increase in vitamin A than carotene. In the case of two heifers which received cod-liver oil, the vitamin A content of the plasma increased independently of the carotene concentration, while three adult cows which were on pasture gave very high carotene values, but the vitamin A content of their plasma was not any higher than for animals receiving the controlled levels of carotene or vitamin A in the form of cod liver oil. From these results it is suggested that the degree of carotenaemia depends upon the exogenous supply of carotene and therefore varies within wide limits, while the vitamin A content of the plasma reaches a less variable physiological level, which it maintains as long as the carotene storage or supply is adequate, but which also decreases in the state of deficiency.—R. ALLCROFT.

WARD, R. E., BECHDEL, S. I., & GUERRANT, N. B. (1940). **Carotene and Vitamin A in the Nutrition of Growing Dairy Cattle.**—*J. Dairy Sci.* **23.** 115-124. 1 fig., 2 tables. [16 refs.]

The minimum carotene requirement of growing Holstein and Guernsey calves was found to be 11 γ per day per pound body weight, but the data showed that the carotene intake necessary to protect different animals against vitamin A deficiency varied very widely, even when the calves consumed similar rations; also the adequacy of this amount of carotene depends on the source of supply. Although it appears desirable that the carotene intake should be considerably above the minimum requirement of 11 γ it was found that the increases above that level did not result in marked improvement in growth rate.

The order of the availability of carotene to calves from various sources was found to be as follows :– (1) carotene concentrate; (2) alfalfa hay; (3) maize silage; (4) maize meal; (5) Timothy hay, and (6) alfalfa molasses silage.—R. ALLCROFT.

LINTON, R. G., & BROWNLEE, A. (1939). **Vitamin A Content of the Livers of a Hundred Healthy Dogs.**—*Nature, Lond.* **144.** 978-979. [7 refs.]

Portions of liver were removed within a few hours of death from unwanted city dogs which had been destroyed by coal-gas poisoning and not subsequently bled. The vitamin A content of suitably prepared extracts was determined by the use of a Lovibond tintometer, and found to have the extremely wide range of from 4·5-19,625 " blue units " per gramme of liver tissue; the average value was found to be 678 units, and the medial figure, taken as an average of the middle six figures, to be 153·5 units. The dogs were " presumed to be healthy ", but the exact age was unknown; the values obtained from the livers of 23 lean and three very fat animals gave no indication of any correlation between the vitamin A reserve and bodily condition.—ALASTAIR N. WORDEN.

FRASER, H. F., TOPPING, N. H., & ISBELL, H. (1940). **The Bacterial Assay of Riboflavin in the Urine and Tissues of Normal and Depleted Dogs and Rats.**

—*Publ. Hlth Rep., Wash.* **55.** 280-289. 4 tables. [14 refs.] [Authors' summary copied *verbatim*].

1. A microbiological method using the *Lactobacillus casei* was employed for the assay of riboflavin in the urine and tissues of normal and depleted dogs and rats.

2. There is a definite reduction of riboflavin in the urine of depleted dogs and rats as compared to control animals on stock diets, or basal diets adequately supplemented with riboflavin. This depletion of riboflavin content of the urine is observed before the animals manifest significant symptoms of riboflavin deficiency.

3. The riboflavin content of several tissues of depleted dogs and rats was reduced as compared to control animals on stock diets, or basal diets appropriately supplemented with riboflavin.

4. These observations indicate that the bacterial method of Snell and Strong for the assay of riboflavin is a useful adjunct in determining the nutritional status of dogs and rats respecting riboflavin.

FRENS, A. M. (1938). Pellagra bij varkens. [**Pellagra in Swine (Review)**].—*Tijdschr. Diergeneesk.* **65.** 1141-1147. [9 refs.] [English, French and German summaries].

Recent researches have given evidence that swine are susceptible to lack of the pellagra-preventing (P.P.) vitamin, and that the symptoms caused by rations low in this vitamin diminish when it is administered parenterally. F. suggests also that P.P. vitamin deficiency may complicate certain diseases in swine, either when there is deficiency in the rations or when resorption is disturbed by diarrhoea. He suggests that the subject should be studied.—JAC JANSEN (UTRECHT).

HARMAN, Mary, KRAMER, Martha M., & KIRGIS, H. D. (1938). **Lack of Vitamin C in the Diet and Its Effect on the Jaw Bones of Guinea Pigs.**—*J. Nutrit.* **15.** 277-284. 2 figs. [15 refs.] [Authors' summary copied *verbatim*].

The data from this investigation show that:

1. In guinea pigs on the Sherman, LaMer, Campbell vitamin C free diet without supplement, there was resorption of bone at the bases of the cheek teeth and along the edge of the alveolar area. This resorption occurred without respect to the age of the animal.

2. Four weeks on the diet was sufficient time to produce a considerable amount of resorption.

3. The addition of 3 ml. of orange juice per 300 gm. body weight gave almost complete protection against resorption.

4. Guinea pigs fed the vitamin C free diet supplemented with greens ad libitum, those on the adequate Ibsen diet and embryos from mothers on the Ibsen diet had firm and strong jaw bones.

—. (1939). **Recent Work on Vitamin C.**—*Brit. med. J.* Dec. 9th. 1145-1146. [15 refs.]

A study of the vitamin C content of the placenta, foetal and maternal liver, blood serum and urine during pregnancy in human beings and in a number of animals has shown that there is increased need for this vitamin during pregnancy. Work has also been done which supports the need for increased requirements during sickness, exercise and growth. A greater intake of vitamin C is required to main-

tain robust health than to prevent signs of avitaminosis ; as much as 300 mg. per day has been suggested. In the brain, more vitamin C has been found in the vegetative centres. Large doses of vitamin C are reported to be beneficial in cases of lead poisoning.—E. I. McDougall.

Mouriquand, G., & Morenas, L. (1938). Des influences réciproques des avitaminoses A et C et du parasitisme intestinal par les protozoaires. Étude des diarrhées scorbutiques. [**The Reciprocal Influence of Avitamosis A and C and Intestinal Parasitism by Protozoa**].—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 188-195. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In French].

The authors, working with rats and g. pigs, found that a diet lacking in vitamin A caused a destruction of intestinal flagellates, probably by making the pH of the caecal contents more favourable for certain bacteria. Lack of vitamin C, however, seemed to favour the multiplication of intestinal protozoa. The protozoa appeared to have no influence on the development of avitaminosis or of scorbutic diarrhoea. —U. F. Richardson.

Drummond, J. C., Noble, R. L., & Wright, Margaret D. (1939). **Studies on the Relationship of Vitamin E (Tocopherols) to the Endocrine System.**—*J. Endocrinol.* **1.** 275-286. 5 figs. on 2 plates, 7 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

Vitamin E when administered to immature female rats or to hypophysectomized adult female rats did not exert any effect on the ovaries, uterus or vagina.

The pituitary glands of E-deficient male rats were found to contain an increased amount of gonadotrophic hormone. Glands from E-deficient female rats showed a decreased amount of luteinizing hormone when tested on immature hypophysectomized rats.

The ovaries of E-deficient female rats responded normally to extracts of pregnant mare serum. In male E-deficient rats such extracts produced only stimulation of the interstitial cells of the testes, and did not affect the degenerated tubules. Hypophysectomy of male E-deficient animals was followed by a further decline in weight of the testes. In such animals pregnant mare serum stimulated only the interstitial elements of the testes.

The suggestion that the effects of vitamin E deficiency are produced by a hormonal inbalance is not supported by the experimental evidence described.

Underbjerg, G. K. L., Thomas, B. H., & Cannon, C. Y. (1938). **Effect of Decreased Body Reserves of Vitamin E on the Reproduction of Goats.**—*Proc. 31st ann. Meet. Amer. Soc. anim. Prod., 1938.* pp. 62-67. [8 refs.]

When large quantities of milk, butterfat, muscle and adipose tissue, obtained from goats restricted for one or more generations to a ration deficient in vitamin E, were fed to sterile, vitamin E-depleted rats, resorption gestations typical of avitaminosis E occurred. Conversely, much smaller quantities of similar materials obtained from goats reared under usual farm conditions, gave positive tests for vitamin E. Although the vitamin E content of the milk and certain tissues of the goats was markedly decreased due to maintenance for an extended period of time on a vitamin E-deficient diet, there was no apparent deleterious effect on their reproduction. These results confirm the authors' previous conclusion [*V. B.* **9.** 798.] that goats do not require rations supplemented with vitamin E to ensure satisfactory reproduction.—R. Allcroft.

MARTIN, A. J. P., & MOORE, T. (1939). **Some Effects of Prolonged Vitamin E Deficiency in the Rat.**—*J. Hyg., Camb.* **39.** 643-650. 3 figs. on 1 plate. [Numerous refs.]

Prolonged deficiency of vitamin E caused in females a yellow to brown discolouration of the uterus, discernible in 3-4 months, and in males brown discolouration of the seminal vesicles, and the same change to a lesser extent in the skeletal muscles of both male and female rats which developed the paresis described by RINGSTED (1935). The hind limbs of these rats developed muscular dystrophy identical with that found by GOETTSCH and PAPPENHEIMER (1931) in g. pigs, few normal muscle cells remaining in advanced cases. The discolouration consisted of small, yellow granules in the smooth muscle cells. In many cases there was also a degeneration of the epithelium of the convoluted tubules of the kidney. All these effects were prevented by administering vitamin E concentrate or *dl*-α-tocopherol.—E. I. MCDOUGALL.

I. FIESER, L. F. (1940). **The Synthesis of Vitamin K_1.**—*Science.* **91.** 31-36.

II. DOISY, E. A., BINKLEY, S. B., THAYER, S. A., & MCKEE, R. M. (1940). **Vitamin K.**—*Ibid.* 58-62. [Numerous refs.]

I. A report is given of the synthetic research work which established the structure of vitamin K_1 as 2-methyl-3-phytyl-1, 4-naphthoquinone.

II. In this résumé of the investigations following DAM's first observations on the haemorrhagic syndrome in 1929, the sources of vitamin K, bio-assay, methods of extraction and purification, the isolation and the establishment of the constitution of the vitamin are described. Preliminary work on the therapeutic applications is discussed and a short account given of simple water soluble compounds with antihaemorrhagic properties for clinical work.—R. ALLCROFT.

PUBLIC HEALTH

I. GILTNER, W. (1938). **Milk Hygiene in the United States of America.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 1143-1153. [In English: French, German and Italian summaries. Discussion pp. 1165-1166 in English and German].

II. DEVINE, B. (1938). **Estimate of the Value of Milk from a Hygienic Point of View.**—*Ibid.* 1154-1160. [In English: French, German and Italian summaries. Discussion pp. 1165-1166 in English and German]. [Reprinted in *Vet. Rec.* **50.** 1725-1727].

III. EL-GHERIANY. (1938). **Putrefactive Bacteria, and Their Detrimental Effect on the Hygienic State of Milk.**—*Ibid.* 1161-1165. [In English: French, German and Italian summaries. Discussion pp. 1165-1166 in English and German].

I. A résumé of the present position of milk hygiene in the U.S.A. Half the milk inspectors have no professional training, and only about half of the trained staff is composed of veterinarians. Veterinarians comprise 13·2% of the 282 milk inspectors employed by the various states, whilst agricultural graduates and sanitary engineers comprise 5·3% and 2·5% respectively. There is thus a trend towards health department control. Of 702 municipal milk inspectors, 22·8% are veterinarians, 14·2% medical graduates, and 2·4% sanitary engineers.

The U.S.A. as a whole has a fairly good milk supply, but in many rural areas it is neither safe nor satisfactory. Every precaution should be taken to limit the supply to that produced from healthy cattle and to ensure that the personnel

includes neither carriers of nor those clinically affected with the germs of milk-borne disease.

Ultra-violet irradiation of milk is used only to a limited extent, because the processes are patented and the royalties increase the cost of production. Ultra-violet irradiated milk is not an adequate substitute for cod-liver oil or sunshine. There is only limited use of homogenization (reconstituted from dried milk in powder form). Milk of low grade apparently finds its way into milk condensing factories in those communities where the control is lax.

II. The production of hygienic milk from cows, especially in Great Britain, is hampered by the presence of tuberculosis and bovine contagious abortion. The logical method of ensuring a safe milk supply is to eliminate diseases of the cow. Public health authorities in Great Britain have concentrated on establishing and maintaining hygienically planned and managed byres, dairies and equipment, but have given insufficient attention to the health of the cow. Pasteurized milk has been semi-officially declared to be safer than raw milk and has been so much advertized that it has become accepted by a large proportion of the general public as being " ideal ". This has proved a deterrent to schemes organized for eliminating the root causes of unsafe milk. The medical profession has so wholeheartedly supported pasteurization that lack of appreciation of the need for eradication of disease has resulted.

Isolated tuberculin testing of cattle as carried out by the department shows that the incidence of infection varies from 5-50%. During a period of over 30 years the Veterinary Department of the City of Birmingham has found that, at the initial testing of herds, approximately 40% of adult cows react. During the same period the Birmingham authorities have submitted to the g. pig inoculation test samples of bulk milk from farms supplying the city, and have found 7·5% to contain living tubercle bacilli.

The type of tuberculin and the methods used should be standardized. Bovine contagious abortion is so prevalent that it is difficult to eliminate both it and TB. at the same time. It is possible to eradicate TB. by general testing, branding of reactors, and by preventing their sale except for slaughter. National measures should be instituted for the eradication of bovine contagious abortion.

III. Milk production in Egypt has not yet attained a satisfactory hygienic standard. Instruction has been given to promote cleanliness during milking and the position is improving. A model dairy has been constructed at Gemezah Experimental Station and the production of clean milk is studied. Milk grading is discussed.—H. E. Bywater.

Fleischhauer, G. (1938). Ueber Alkoholvorbehandlung von Milchproben zur Verbesserung des Nachweises von Abortus-Bang- und Tuberkelbakterien mit Hilfe des Meerschweinchenversuchs. [**Preliminary Alcohol Treatment of Milk Samples as an Aid to the G. Pig Test for Tubercle Bacilli and** *Brucella abortus*].—*Berl. Münch. tierärztl. Wschr.* December 9th. 761. [2 refs.]

F. describes a new technique for the examination of milk samples for tubercle bacilli and *Br. abortus*. The milk is centrifuged; the cream and sediment are mixed and treated with 70% alcohol. The mixture is centrifuged and the cream and sediment are again separated and mixed; this mixture provides the inoculum for injection into g. pigs.

He claims that with this technique he obtained 19·5% more positive results for *Br. abortus* and 2·4% more for tubercle bacilli than with the German official method.—J. E.

Rasch, K. (1939). Wird durch die Alkoholvorbehandlung von Milchen der Nachweis von Abortus-Bang- und Tuberkelbakterien im Tierversuch gefördert? [**Alcohol Treatment of Milk for the Demonstration of** *Brucella abortus* **and Tubercle Bacilli**].—*Berl. Münch. tierärztl. Wschr.* June 2nd. 350-352.

R. tested comparatively Fleischhauer's method [see above] and the official method on 190 samples of milk. In 164 cases the result of the two tests agreed, but it differed in the remainder. He concludes that Fleischhauer's method is not appreciably superior to the standard method.—M. F. Benjamin.

Nevskiĭ, I. N. (1935). Ustoĭchivost' brutselly v moloke pri raznykh temperaturakh. [**Viability of Brucella in Heated Milk**].—*Bull. Uzbek. nauchn.-issled. vet. Inst., Tashkent.* Nos. 1-2. pp. 36-38. 2 tables. [4 refs.]

Some strains of *Brucella melitensis* contained in milk, survived heating to 80°C. for 20 minutes and retained their virulence for g. pigs.—E. Martin.

Johns, C. K. (1940). **The Lengthening of the Reduction Time in Milk with the New Standard Methylene Blue Solution.**—*Canad. publ. Hlth J.* **31.** 155-158. 2 figs. [4 refs.] [Author's summary copied *verbatim*].

The average increase in reduction time using the new methylene blue solution (thiocyanate 1:300,000) for summer milks is around 30 minutes. The greater increase previously reported appears to be due to the slower drop in potential noted for many samples of winter milks.

The slower reduction with the new dye concentration appears to be due to the lower potential at which the dye-milk mixture decolorizes.

Wyllie, J. (1940). **The Application of the Photelometer to Kay and Graham's Phosphatase Test.**—*Canad. publ. Hlth J.* **31.** 147-155. 1 fig., 5 tables. [7 refs.] [Author's summary copied *verbatim*].

The use of a photelometer to give a measure of the relative intensities of the blue colours, obtained when samples of raw and pasteurised milk are subjected to the Kay and Graham phosphatase test, is described. The photronic cell of the instrument acts as a sensitive mechanical eye and eliminates the sources of error and inaccuracy of the human eye of different observers. The photelometer is first adjusted to read a full-scale deflection (100 divisions) when a cell containing distilled water is inserted between the source of light and the photronic cell. Readings are then taken by introducing the blue coloured solutions contained in spectroscopic absorption cells into the sliding carriage of the photelometer. It has been found convenient to use the reagent control as the standard of reference and to record the photelometer-reading differences for milk samples and controls.

Moffat, A. B., & Mackay, J. (1938). **The Coliform Test in Pasteurized Milk.**—*Canad. publ. Hlth J.* **29.** 283-287. 3 tables. [9 refs.]

The examination of 857 specimens of pasteurized milk and cream for coliform-group organisms with standard brilliant-green lactose-bile media yielded 46% positive " presumptive tests ". In carrying these positive specimens through to the " completed test " the percentage of positives dropped to 29. In a further differentiation between *Bact. aerogenes* and the *coli* group proper, more than half of the cultures were allotted to the latter group.

It is held that such a high percentage of the *coli* group proper in the final product is most probably due to the occasional passing of incompletely pasteurized milk from the pasteurizer into the cooling and bottling section.

If the coliform test is conducted as a routine in conjunction with the standard plate count, 10-20% positive " presumptive tests " of 1 c.c. portions tested is an acceptable requirement for the approval of freshly pasteurized milk. [The terms " presumptive tests " and " completed tests " are defined in the 6th edition of " Standard Methods of Milk Analysis." New York: American Public Health Association (1934)].—H. KONST.

CHRISTENSEN, E. H., KROGH, A., & SAHLSTEDT, V. (1939). **Nitrous Oxide and Nitrogen Narcotisation of Animals to be Slaughtered According to the Jewish Ritual.**—*Vet. Rec.* **51.** 135-137. 2 figs.

The requirements of slaughter by the Jewish ritual of " Schechita " are outlined, it being essential that in the process of stunning no lethal injury shall be inflicted.

When nitrogen gas is given there is loss of consciousness without pain in one or two minutes. Certain cows make strong involuntary movements under nitrogen; if nitrous oxide is administered for a period before the nitrogen this tendency is overcome. The addition of 4-5% of carbon dioxide to the nitrogen prolongs the duration of respiration. The combined method (N_2O followed by $N + CO_2$) is very convenient as the heart and respiratory actions continue long enough for the slaughter to be completed and for good bleeding to be obtained. The time required for narcotization by this method is three-quarters to one minute for calves and one and a half to three minutes for adult cattle. The amount of N_2O required by one adult bovine is 50 litres and of N, 200 litres, the cost being three to four Swedish kronor.—H. BURROW.

I. NICLAS, A. (1937). Untersuchungen im Schlachthof zu Dortmund gesund geschlachteter Rinder auf Bakterien der Enteritis-Gruppe. [**Examination of Healthy Slaughtered Animals at Dortmund Abattoir for Bacteria of the Enteritis Group**].—*Inaug. Diss., Berlin.* pp. 22. 1 table. [Numerous refs.]

II. BARTEL, H. (1938). Die bei den schlachtbaren Haustieren vorkommenden Bakterientypen der Paratyphus-Enteritisgruppe. [**The Types of Salmonella in Slaughter Animals**].—*Tierärztl. Rdsch.* **44.** 601-606. 5 tables.

III. BARTEL, H. (1938). Die geographische Verteilung der von Schlachttieren isolierten Enteritisbakterienstämme in Deutschland. [**The Geographic Distribution of Salmonella Infection in Slaughter Animals in Germany**].—*Ibid.* 669-672. 3 tables, 1 map. [1 ref.]

IV. PIENING, C., & MAHLAU, E. (1938). Zur Frage der Enteritisbekämpfung der Rinder. [**Control of *Salmonella enteritidis* Infection in Cattle**].—*Berl. tierärztl. Wschr.* Jan. 21st. 33-36. 1 fig. [Numerous refs.]

V. BOROWKA, W. (1939). Untersuchungen gesund geschlachteter Rinder auf Bakterien der Enteritis-Gruppe. [**Examination of Healthy Slaughtered Cattle for Salmonella**].—*Inaug. Diss., Berlin.* pp. 17. 1 table. [Num. refs.]

I. N. discussed the aetiology and epidemiology of salmonella infection. His own work concerned 500 animals of different ages slaughtered in the Dortmund abattoir; the animals had been examined before slaughter and the carcasses examined in the course of abattoir meat inspection, and passed as suitable for human food. Portal and mesenteric lymph nodes were examined according to the regulations of the German Bacteriological Meat Inspection Act. *S. typhi-murium* was found in four carcasses and N. therefore considers that latent salmonella infection may exist in animals that appear to be healthy.

II. During 1937, B. isolated and typed paratyphoid organisms from 1,690 slaughter animals. *S. enteritidis* was isolated in 78% of these animals, *S. typhi-*

murium in 16%, and *S. cholerae-suis* in 2%, mostly var. *kunzendorf*, var. *voldagsen* being found only three times. *S. abortus-equi*, *S. abortus-ovis* and *S. paratyphi B* were only found in a few animals. Salmonella meat poisoning in man is discussed with reference to the origin of infection. Although cattle are the most common source of infection, other animals may also be on occasion.

III. During the course of a survey of salmonella infection in Germany [see II] B. defined the most infected districts in Germany, showing them on a map. The provinces with the highest incidence were the Rhineland, Holstein, East-Prussia, Pomerania and Silesia. Southern Germany was nearly free from infection. There were marked differences in the organisms responsible : *S. enteritidis* (Kiel type) predominated in Northern, Eastern and Western Germany, whilst *S. typhi-murium* was mostly found in Silesia, Thuringia and in the southern districts of Germany. B. states that the presence of paratyphoid organisms is confined mostly to the lowland districts. *S. enteritidis* was wide-spread in the affected districts ; the distribution of *S. typhi-murium* on the other hand was limited.

IV. The control of salmonella infection in cattle was enforced in Prussia in 1937. The authors describe their observations and experiences, and state that besides adult cattle, the trade in calves and heifers spreads the infection from one herd to others. Markets should therefore be included in the control examination. They conclude that carriers are the main source of transmission of enteritic diseases of cattle due to salmonella. Malachite-green broth and tetrathionate broth plus bile as enrichment media, with subsequent growth on brilliant-green phenol-red agar plates, were found to be best for isolation by culture.

V. B. describes the examination of 500 apparently healthy cattle slaughtered at the Oppeln abattoir, the carcasses of which were passed after inspection. Examinations of material from these animals for salmonella infection were conducted according to the official regulations concerning bacteriological meat inspection with differentiation media and by agglutination tests. *S. typhi-murium* was isolated from one animal. B. concludes that healthy animals may be latently infected. Only the enrichment method reveals such animals. In his experience, animals with latent infection do not cause meat poisoning. He considers that the portal or mesenteric nodes should be bacteriologically examined to trace latent infection.—M. F. Benjamin.

Slocum, G. G., & Linden, B. A. (1939). **Food Poisoning Due to Staphylococci with Special Reference to Staphylococcus Agglutination by Normal Horse Serum.**—*Amer. J. publ. Hlth.* **29.** 1326-1330. [13 refs.]

The occurrence of 20 outbreaks of food poisoning apparently due to staphylococci, all of which followed the consumption of ham or tongue, is discussed. The sources of contamination were not determined. Several methods were attempted in order to secure a simple and rapid procedure for the identification of food-poisoning staphylococci. A study of 37 strains of which 35 were considered enterotoxic at the time of isolation, demonstrated that after storage the great majority had lost their ability to produce enterotoxin and to liquefy gelatin rapidly. A fundamental difference between entero- and non-enterotoxic strains was indicated by a marked difference in their agglutinability by normal horse serum. When suspensions of live staphylococci were mixed with varying dilutions of normal horse serum and incubated at 37°C. for three hours, followed by storage at 7°C. over night, enterotoxic strains failed to agglutinate, while non-enterotoxic strains were completely agglutinated in the 1:10 serum dilution and almost completely in the 1:20 dilution. Since only one horse serum and a few selected strains of

staphylococci were investigated, the results are not conclusive. Further investigations are in progress to determine whether this agglutination phenomenon is sufficiently characteristic to be of differential value.—N. J. Scorgie.

THERAPEUTICS

I. Anon. (1938). **The Mechanism of the New Chemotherapy.**—*Brit. med. J.* March 5th. 522-523. [8 refs.]

II. Rich, A. R., & Follis, R. H., Jr. (1938). **The Inhibitory Effect of Sulfanilamide on the Development of Experimental Tuberculosis in the Guinea Pig.**—*Johns Hopk. Hosp. Bull.* **62.** 77-84. 2 figs. on 1 plate. [11 refs.]

I. Domagk [*V. B.* **10.** 210.] believes that the action of prontosil is not merely dependent on the liberation of sulphanilamide in the body or that its effect is simply that of an antiseptic. There is evidence that an opsonic effect is involved in addition to the bacteriostatic action, and that there may also be a neutralization of toxins.

II. Fifty-nine g. pigs were inoculated with virulent human tubercle bacilli under standard conditions, and 31 of these animals received daily doses of crystalline sulphanilamide by mouth (100-500 mg.). All the controls showed extensive TB. at the end of the experiment, which lasted 5-6 weeks. Animals receiving 100 mg. per day showed no difference from the controls; in those receiving 200 mg. per day, tuberculous lesions were definitely smaller than in the controls; in those receiving 500 mg. per day there was marked inhibition of the tuberculous process, and at the end of the experiment the local lesion and nodules were minute and there was no splenic enlargement.—J. M. Robson.

Speert, H. (1940). **The Placental Transmission of Sulfanilamide and its Effects Upon the Fetus and Newborn.**—*Bull. Johns Hopk. Hosp.* **66.** 139-155. 8 figs., 1 table. [12 refs.] [Author's summary copied *verbatim*].

1. The administration of sulfanilamide to rats throughout gestation causes it to appear in equal concentrations in the blood streams of the mother and the fetuses.

2. Prolonged administration of sulfanilamide to pregnant rats produces deleterious effects upon the offspring. These effects include increased intra-uterine and postnatal mortality, decreased litter size, diminished birth weight and selective stunting of growth.

3. Until further observations have been made of the effects of sulfanilamide upon the human fetus, the drug should be administered with extreme caution during pregnancy. Such observations should include a careful study of intra-uterine development, birth weight, and postnatal growth in the infants born to mothers receiving extended sulfanilamide therapy during gestation.

Bauer, H., & Rosenthal, S. M. (1938). **Studies in Chemotherapy. VII. Some New Sulphur Compounds Active Against Bacterial Infections.**—*Publ. Hlth Rep., Wash.* **53.** 40-49. 2 figs., 2 tables. [12 refs.] [Authors' summary copied *verbatim*].

Some new derivatives of sulfanilamide and di-sulfanilamide have been prepared and tested against streptococci and pneumococci. Only one compound in this group proved to be slightly superior to sulfanilamide, the sulfanil p-amino-anilide. It has been confirmed that much more favourable results are obtained with di-sulfanilamide when it is injected in oil than when given orally. By mouth di-sulfanilamide has a therapeutic index only twice as good as sulfanilamide.

Comparative studies of toxicity and chemotherapeutic action have been carried out in mice on the diamino diphenylsulfone, first studied by BUTTLE [*V. B.* **6.** 890.] and coworkers, the acetyl derivative of this compound introduced by FOURNEAU [*V. B.* **7.** 299.] and coworkers, and the formaldehyde sulfoxylate derivative first prepared by us.

The diamino diphenylsulfone was found to be approximately 30 times as active against streptococci as sulfanilamide, but its high toxicity makes its therapeutic index only two times as favourable.

The formaldehyde sulfoxylate derivative on subcutaneous injection has a therapeutic index approximately five times as good as sulfanilamide orally. This compound is of interest in that it is the first water soluble preparation that we have obtained with high therapeutic activity.

The acetyl derivative possesses a therapeutic index more than six times as high as sulfanilamide against streptococcal infections in mice.

Against pneumococcal infections in mice these three sulfones are all superior to sulfanilamide. However, in mice the action is still considerably less marked than against streptococci; and, while marked prolongation of life can be achieved, few animals permanently survive pneumococcal infections as a result of therapy.

I. ROSENTHAL, S. M. (1939). **Studies in Chemotherapy, VIII. Some Toxic Effects of Repeated Administration of Sulfanilamide and Sulfanilyl Sulfanilamide (" Di-sulfanilamide ") to Rabbits and Chickens.**—*Publ. Hlth Rep., Wash.* **54.** 95-106. 6 figs., 6 tables. [16 refs.]

II. NELSON, A. A. (1939). **Histopathological Changes in Hens and Rabbits following Administration of Sulfanilamide and Sulfanilyl Sulfanilamide (Di-Sulfanilamide).**—*Ibid.* 106-127. 9 figs. on 3 plates, 3 tables. [15 refs.]

I. Sulphanilamide has a cumulative toxic action in rabbits. Repeated oral administration of 0·5-1 g. per kg. produced nervous symptoms, weakness, emaciation and many deaths. A higher dosage was tolerated on a cabbage diet than on a diet of oats plus cabbage or oats alone. In hens, a daily oral dose of 0·5-1 g. per kg. produced neuro-muscular weakness and emaciation; death frequently occurred, often delayed as long as 1-4 weeks after the last dose. Disulphanilamide also produced cumulative and delayed toxic effects, but was somewhat less toxic than sulphanilamide.

II. The histopathological changes in the rabbits included renal and testicular degenerative changes, splenic haemosiderosis, slight peripheral neuritis, focal pneumonitis and hypo- or hyperplasia of the bone-marrow. In hens, a fatty liver was the chief lesion, but there was also fat and haemosiderin deposition in the kidney, haemosiderin in the spleen, and, frequently, peripheral neuritis and hypoplasia of the bone-marrow.—J. M. ROBSON.

PRIESTLEY, F. W. (1940). **The Treatment of *Br. Abortus* Infection in Guinea-Pigs with M & B 693.**—*Vet. Rec.* **52.** 3-5. 3 tables, 1 chart. [4 refs.] [Author's summary copied *verbatim*].

Treatment of *Br. abortus*-infected guinea-pigs with M & B 693 in doses bordering on the toxic limit resulted in a proportion of cures but the results were not sufficiently encouraging to advocate its trial on any extended scale or in cattle.

VAN SOMEREN, V. D. (1939). **The Treatment of Experimental Trichinosis in the Rat with Butolan.**—*J. Helminth.* **17.** 65-68. 1 table. [4 refs.]

The author gives the results of dosing 20 rats, artificially infected with

Trichinella, with " butolan ", the anthelmintic action of which probably depends on the presence of a phenolic hydroxyl. He found that a total dose of 1·5 g. *per os* caused a fairly high mortality of the adult parasites, but that the drug appeared to have no action on migrating or encysted larvae. On these results, a suggestion is made of dosing cases of trichinosis diagnosed early in adult human beings, with 0·5 g. of butolan three times daily for seven days. A contra-indication would be evidence of severe kidney damage.—KATHARINE SANDERSON.

HART, B. F., & EVANS, E. (1939). **Ineffectiveness of Sulfanilamide in Rabies from Vaccinated Dogs.**—*J. Amer. med. Ass.* **112.** 731-732.

The patient, a man, was bitten on a lip by a dog which had been vaccinated against rabies by the single injection method six months before, symptoms having developed in the dog in 22 days. Sulphanilamide was given to the patient, but it did not influence the course of the rabies infection. [This case gives additional support to the opinion that dogs cannot be effectively immunized by a single dose of killed virus].—J. E.

BOURSNELL, J. C., & WORMALL, A. (1939). **Studies on Bayer 205 (Germanin) and Antrypol. IV. The Retention of the Drug in the Animal Body.**—*Biochem. J.* **33.** 1191-1200. 6 tables. [Numerous refs.] [Authors' summary copied *verbatim*] [For Part III, see *V. B.* **10.** 211].

1. Investigations have been made to determine the cause of the long retention of Bayer 205 (or Antrypol) in the animal body after injection of the drug. In particular, the possibilities of (a) storage in certain organs, and (b) combination with plasma- and tissue-proteins have been studied.

2. There is no marked storage of the drug in the liver, heart, muscle, lung, brain, adrenals or pancreas of rabbits which have received one, two or three injections of Antrypol. Each of these organs, except the brain, retains a small but measurable amount of the drug, possibly in combination with the tissue proteins.

3. The kidneys of these injected rabbits contain considerably more Antrypol than do the other tissues examined, and the amount present (in terms of mg. drug/g. kidney) varies appreciably from one animal to another. This retention of the drug in the kidney is of special significance in view of the fairly frequent occurrence of albuminuria following the injection of the drug into man.

4. The spleen contains a little more of the drug than do the other organs examined, but considerably less than the kidney. Slight retention in the spleen might possibly be due to association of the drug with the reticulo-endothelial system.

5. Various protein fractions have been separated from the serum and plasma of injected rabbits, and from normal serum to which Bayer 205 has been added. Evidence has been obtained that plasma globulin and probably other proteins can combine (by adsorption or otherwise) with this drug.

6. The conclusion is reached that the long retention of Bayer 205 in the animal body is due to the combination of the drug with plasma and tissue proteins.

HOBSON, R. P. (1939). **Effect of Suint on Sheep Dips.**—*Nature, Lond.* **144.** 1093-1094. 1 table. [1 ref.]

Suint, the water-soluble fraction of the yolk in living fleece, has good wetting properties. H. found that, when several sheep are dipped in an arsenical dip, the accumulation of suint in the bath so lowers the surface tension of the wash that there is a marked reduction in the amount of arsenic retained by the fleece, and

also in the subsequent duration of the arsenic on the wool. After 264 full fleeced sheep were dipped [capacity of bath not stated] the amount of soluble arsenic retained on the dorsal wool was approximately two-fifths of that retained at the commencement of dipping. The rapidity of loss of the arsenic, estimated 26 days later, was more than doubled, and the duration of protection against myiasis, estimated biologically, was reduced from three to two weeks. H. suggests that this effect of suint may be responsible, in part at least, for the decrease in efficiency of fly dips, known to occur after large numbers of sheep are dipped, and usually attributed to contamination by excreta.—J. MacLeod.

Gordon, H. McL. (1939). **Anthelmintic Efficiency against Immature** *Haemonchus contortus*.—*Aust. vet. J.* **15.** 57-66. 1 table, 2 graphs. [8 refs.]

The efficiency of anthelmintics against adult *H. contortus* has been tested on many occasions, but there is no recorded information regarding their value against the immature forms of this species. Information on this point is of great importance in deciding upon the interval between treatments, particularly when dealing with an acute outbreak of haemonchosis. Attention was drawn to this aspect of treatment by a number of outbreaks in which the usual measures appeared to fail.

Worm-free lambs 5-6 months old were used for the experiment. The anthelmintics tested and dosages used were (a) copper sulphate (0·6 g. in 25 ml. water); (b) carbon tetrachloride (2 ml. in 3 ml. liquid paraffin); (c) copper sulphate (0·7 g.) and sodium arsenite (0·85 g.) in 25 ml. water; (d) copper sulphate (0·7 g.) and nicotine sulphate (0·7 ml.) in 25 ml. water.

Treatment was not as efficient against immature as against mature *H. contortus*. Mixtures of copper sulphate with sodium arsenite and copper sulphate with nicotine sulphate were more efficient than carbon tetrachloride against immature *H. contortus*. Copper sulphate alone in solution appeared to be very ineffective.

As a result of the general inefficiency of these drugs against the immature worms, it would seem that treatment must be repeated at intervals of about 10 or 14 days during severe outbreaks of haemonchosis. Inefficiency of the anthelmintics against immature *H. contortus* offers an explanation for apparent failures of treatment in severe outbreaks of haemonchosis in the field, particularly in those instances in which the treated flock was not moved from infected pastures.

—H. B. Carter.

Habermann, R. T., & Harwood, P. D. (1940). **Efficacy of Recrystallized Phenothiazine for the Removal of Nematodes from the Gastrointestinal Tract of Sheep.**—*Vet. Med.* **35.** 24-29. 4 tables. [15 refs.]

Commercial phenothiazine is a highly efficient anthelmintic for sheep, but the therapeutic dose is bulky. Recrystallized phenothiazine is less bulky. The value of the latter was tested on 24 sheep averaging 96 lb. body weight, counts being made of the number of helminths voided in the faeces during the week following administration, and the number recovered on autopsy at the end of that period.

Doses of 20 g. proved very effective for the removal of *Oesophagostomum*, *Haemonchus* and *Ostertagia* spp. Doses of 25 g. removed as well a high percentage of *Bunostomum trigonocephalum* and *Chabertia ovina*, and a smaller number of *Trichostrongylus* and *Cooperia* spp.

One ewe was given 107 g. of recrystallized phenothiazine over a period of 21 days, without ill effect.—D. D. Ogilvie.

YOKOGAWA, S., & RO, M. (1939). **Studies on the Treatment of Paragonimiasis. Part I. Experimental Treatment and Efficacy on Dogs Harbouring Lung Flukes** (*Paragonimus westermanii*).—*J. med. Ass. Formosa.* **38.** 552-565. 5 tables. [Numerous refs.] [In Japanese: Authors' English summary p. 565, copied *verbatim*].

The authors used intramuscular injections of prontosil soluble in combination with emetine hydrochloride in the treatment of dogs experimentally infested with lung flukes, and found it to be much more satisfactory than the use of emetine alone which has hitherto been recommended, for the combination of the two drugs brought about a rapid and radical cure.

MOROZOV, S. D., & POLKOVNIKOVA, R. S. (1935). Primenenie gravidana s profilakticheskoĭ tsel'yu pri infektsionnoĭ plevropnevmonii koz. [**Prophylactic Use of Gravidan in Infectious Pleuro-Pneumonia in Goats**].—*Bull. Uzbek. nauchn.-issled. vet. Inst. Tashkent.* No. 4. p. 19.

The preventive power of gravidan was tested on 15 goats. Ten goats were given nine injections each of gravidan in doses varying from 8–17·6 c.c. The remaining five animals served as controls.

After the injection both the experimental and the control groups were brought into contact with animals affected with pleuro-pneumonia, and kept in the infected fold 43-53 days, after which they were killed.

All the control animals contracted the disease within 5-30 days. In the experimental group 62·5% are said to have remained healthy and the remainder contracted the disease in a mild form.—E. MARTIN.

I. —. (1939). **British Standard Specification for Veterinary Cod Liver Oil.**—*Brit. Stand. Inst.* No. 839. pp. 29. 1 table, 8 appendixes.

II. —. (1939). **British Standard Specification for Veterinary Cod Liver Oil.**—*Vet. Rec.* **51.** 847-848.

I. The specification, drawn up for the British Standards Institution by a committee representative of all interests including stockowners and veterinary surgeons, details standards for veterinary cod-liver oil in the following characters :– description, colour, specific gravity and density, refractive index, iodine value, saponification value, acidity, unsaponifiable matter, vitamin potency and blue value. The publication includes a full description of the methods to be followed in determining the various characters.

II. This is an annotation of I and includes the details of the majority of the characters defined in the specification, together with paragraphs explaining and commenting upon the standards laid down.—W. J. IRONSIDE.

COHN, D. J., TANNENBAUM, A., THALHIMER, W., & HASTINGS, A. B. (1939). **Influence of Oxygen and Carbon Dioxide on the Blood of Normal and Pneumonic Dogs.**—*J. biol. Chem.* **128.** 109-135. 2 figs., 5 tables. [Numerous refs.]

Experimental broncho-pneumonia was produced in dogs by intrabronchial injection of 1% hydrochloric acid. The pneumonia was accompanied by pronounced anoxemia, but no significant change was observed in the acid-base balance of the arterial blood. An oxygen-enriched atmosphere increased the O_2 saturation of the arterial blood of normal dogs slightly and of the pneumonic dogs greatly, without alteration in the acid-base balance. The addition of CO_2 to the inspired air caused a slight increase in the arterial saturation of both the normal and pneumonic dogs. It also caused a change in the acid-base balance of the blood in normal and pneumonic dogs indicative of respiratory acidosis which was more

severe in the latter; and some metabolic acidosis also occurred in the pneumonic dogs breathing this atmosphere. In an oxygen-enriched atmosphere containing CO_2 there was increased oxygenation of the blood of both normal and pneumonic dogs and a respiratory acidosis which was greater in pneumonic dogs. Those animals kept in a high CO_2 atmosphere showed change in the acid-base balance indicative of physiological compensation. There was evidence of decreased ability of pneumonic dogs to eliminate CO_2.—F. T. Boyle.

POISONS AND POISONING

Grini, O. (1938). Sinkforgiftninger hos husdyrene samt en oversikt over sinkinnholdet i dyriske organer, animalske og vegetabilske naeringsemner. [**Zinc Poisoning in Domestic Animals, with a Review**].—*Norsk VetTidsskr.* **50.** 746-762. [9 refs.] [English and German summaries].

G. states that chronic zinc poisoning developed in 1938 in Norway in four herds of cattle and some herds of swine, soon after the inclusion in the diet of a daily ration of cheese whey transported in galvanized iron drums. The first symptom in cattle was diarrhoea or dysentery, and later, constipation and flatulence. This was followed by muscular weakness. In the pigs, the main symptom was paralysis of the hindquarters. In cattle the disease lasted about three weeks, and was particularly severe in one of the four herds, comprising 16 animals all of which either died naturally or had to be slaughtered. The zinc was found present on analysis of the whey.

Sassenhoff, Irmgard. (1939). Vergiftungen bei Hühnern und Wildegeflügel mit Metallphosphidgetreide. [**Poisoning of Domestic and Wild Fowls by Metal Phosphide**].—*Arch. wiss. prakt. Tierheilk.* **74.** 513-517. [1 ref.] [Also appeared in *Dtsch. Tierärtzl. Wschr.* **47.** 467].

Phosphides of the metals, generally the cheap zinc phosphide, widely used in the form of poisoned grain for destruction of field mice, occasioned losses of poultry and game birds when not properly laid down in tubes in the holes. Symptoms and pathology were similar to those of phosphorus poisoning. Diagnosis rested on P.M. findings, odour of crop contents, and the chemical detection of phosphoretted hydrogen by silver nitrate paper.—H. H. Green.

Winter, I. C. (1939). **Fat Metabolism following Liver Injury. Decreased Iodine Number of Tissue Fatty Acids of Male Rats following Carbon Tetrachloride Administration.**—*J. biol. Chem.* **128.** 283-287. 1 fig., 2 tables. [8 refs.]

The total and phospholipide fatty acids of the liver and carcass, and the total fatty acids of the faeces of male albino rats, following liver injury caused by injection of CCl_4, had a lower iodine number than those of controls, suggesting that the desaturation processes in the liver are deranged. All had been fed a diet containing a fat of low iodine number. The iodine numbers of the liver fatty acid fractions rise to normal values when animals with liver injury are fed a diet containing more unsaturated fatty acids. There is also some evidence showing that in rats, faecal fatty acids are largely excreted, rather than being derived from unabsorbed food fatty acids.—Alfred Eden.

Scorgie, N. J., & Miller, W. C. (1939). **An Investigation on the Alleged Toxicity of Cod-Liver Oil for Pigs.**—*Emp. J. exp. Agric.* **7.** 357-368. 3 tables. [Numerous refs.]

The toxicity referred to has been recorded by a number of continental workers;

it results mainly in degeneration of the liver. The investigation consisted of two experiments, each involving eight pigs in four groups of two. In the first experiment, three grades of oil, low, medium and high were used, one grade in each of three groups of pigs, the fourth group receiving none. In the second experiment two grades of oil were used, one in each of two groups of pigs, the third group receiving olive oil and the fourth none. The doses of oil given were high in all cases. The first experiment extended over a period of 118 days and the second over 91 days, and in both the pigs remained in good condition throughout. At P.M. examination the livers of all the animals were found to be normal both macroscopically and microscopically, and it is therefore concluded that cod-liver oil is not toxic to the liver even when given in large doses. In explanation of the failure to confirm the findings of the continental workers, a number of possibilities are advanced, including that of deficiency of nicotinic acid in the pigs alleged to have been poisoned.—W. J. Ironside.

Curasson, G. (1939). Sur quelques plantes toxiques ou reputées toxiques pour le bétail. [**Some Plants Poisonous for Livestock**].—*Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 3. 14-16.

A description of certain botanical species collected in French West Africa which are reputed locally to be toxic for animals. The list includes *Culcasia angolensis*, *Carallum* spp., *Ageratum conyzoïdes*, *Icacina senegalensis*, *Burkea africana*, *Albizzia ferruginea*, *Antiaris africana* and *Hillerïa latifolia*. C. gives the geographical distribution of the species mentioned.—N. J. Scorgie.

Franzke, C. J., Puhr, L. F., & Hume, A. N. (1939). **A Study of Sorghum with Reference to the Content of HCN.**—*Tech. Bull. S. Dak. agric. Exp. Sta.* No. 1. pp. 51. Numerous tables. [Numerous refs.]

This bulletin gives the results of an extensive investigation into the HCN content of sorghum forage, grown under varying conditions. The work involved considerable chemical analysis, and the authors found that the best method for recovering HCN from sorghum plants was that of digestion, followed by precipitation of the HCN by $AgNO_3$. As a result of breeding experiments with different strains of sorghum, containing varying amounts of HCN, the authors conclude that the factors controlling HCN production in this group of plants are hereditary, and, whilst they were unable to establish Mendelian segregation of these factors, it appears from their work that low HCN is partially dominant over high HCN content. Experiments were also carried out in order to determine the influence of environmental factors such as type of soil, soil fertility, fertilizers and minerals, systems of cropping and rotation, climatic conditions, etc., on the HCN yield of the plants. From these experiments the authors found that, generally speaking, conditions which promote normal and regular growth in sorghum plants conduce to minimum development of HCN content; conversely, conditions retarding normal growth and development bring about an increase in HCN content. The suggestion is made that it might be possible to produce varieties of forage and grain sorghum with low HCN content, which could be utilized in certain localities such as the Great Plains of U.S.A., with little danger of cyanide poisoning to livestock.—N. J. Scorgie.

Briese, R. R., & Couch, J. F. (1940). **Hydrocyanic Acid in Sorghum Silage.**—*Vet. Med.* **35.** 86-88. 1 table, 1 photograph. [6 refs.]

Although many varieties of sorghum may develop toxic quantities of HCN, there are no reports of animal poisoning from feeding on sorghum silage. In the

investigation reported in this article it was found that silage made from 12 varieties of sorghum had, after 4-4½ months, lost, on an average, 29·7% HCN, as compared with the fresh plants. This loss was not correlated with the quantity of potential HCN in the plant, and in a few samples of the silage the HCN content was still above the level usually regarded as toxic. In the silage nearly all the HCN occurred as free HCN. Much of this was rapidly lost upon exposure to air before feeding, a fact which accounts for the non-toxicity of the silage.—N. J. Scorgie.

Reĭnfel'd, A. K. (1937). Znachenie golovni v etiologii zabolevaniĭ s.-kh. zhivotnykh. [**Tilletia and Ustilago in the Aetiology of Diseases Affecting Domestic Animals**].—*Hygiene of Farm Animals*. pp. 102-130. 3 figs., 3 tables. Moscow: Lenin Academy of Agricultural Sciences.

R. investigated the effect on laboratory and domestic animals both of injections of an alkaloid said to be isolated from *Tilletia* and of feeding on *Tilletia*. By clinical, pathological and microscopic examination, he found that even very large doses (2-4 kg. per head per day) of *Tilletia* in the feed had no ill effect on the health or productive capacity either of the cattle or of the laboratory animals.

The possibility of spores escaping from the gastro-intestinal canal into other tissues and organs is denied and the presence of spores in microscopic preparations is attributed to imperfect technique.

R. believes, however, that pregnant animals should not be given food containing *Tilletia* or *Ustilago*, in view of the ecbolic action of the alkaloid which he states he was able to demonstrate in *Tilletia*.

Much previous work on this subject is quoted, authors' names being mentioned but no sources given. [Dobson (1926. *Trans. Brit. Mycological Soc.* **11.** 82.) found that *T. triciti* was not pathogenic for animals.—Ed.].—E. Martin.

PHYSIOLOGY

Ziegler, H., & Hauser, H. (1939). Anatomie für die Praxis. II. Zur Lage der Speiseröhre und intrathorakalen Bauchorgane beim Rind. [**Anatomy for the Practising Veterinary Surgeon. II. The Oesophagus and Thoracic Viscera in Cattle**]. *Schweiz. Arch. Tierheilk.* **81.** 365-376 and 421-435. 13 figs., 1 graph. [7 refs.] [For part I see *V. B.* **5.** 155].

The topography of the oesophagus and thorax of the cow was studied in both freshly killed and formalin-fixed subjects. The oesophagus describes a distinct curve which brings it on a level with the trachea in the lower third of the neck. Its power of contractility is very great, and there appears to be a "contraction centre" situated at the lowest point of this curve which assists in the process of regurgitation, the mechanism of which is discussed. The original with its illustrations should be consulted by interested readers.—C. W. Ottaway.

Anon. (1939). **The Pharyngeal Pituitary.**—*Brit. med. J.* June 24th. 1291-1292. [1 ref.]

Pituitary tissue was observed in the mucosa of the naso-pharnyx in 51 human necropsies out of 54. Generally it occurred as a single encapsulated mass showing differentiated and undifferentiated cells. The differentiated cells resembled those seen in the anterior lobe, but no functional importance can be ascribed to them. —J. A. Nicholson.

Schultz, O. (1939). Ueber die absolute und relative Querschnittsgrösse der Gyri olfactorii communes beim Hund und bei der Katze. [**Absolute and Relative Size of Cross-Sections of the Gyri Olfactorii Communes in Dogs and Cats**].—*Arch. wiss. prakt. Tierheilk.* **74.** 139-200. 8 figs., 22 tables. [11 refs.]

The olfactory tracts of 54 dogs and an unspecified number of cats were examined in an attempt to correlate their size with a highly developed sense of smell.

In both species they were found to be well developed, especially so in the female. In the majority of cases the right side was found on cross-section to be bigger than the left. The tract in a small dog of the same breed, or even in a smaller breed, was sometimes better developed than in a larger dog. On cross-section, the size of the olfactory gyri was found to be directly proportional to the size of the brain and of the body up to the age of five years, after which it appeared to remain stationary or even to exhibit signs of atrophy.—C. W. Ottaway.

Pasquier, Marie-Antoinnette. (1939). Teneur en sodium du sang total et du sérum de quelques mammifères. [**Sodium Content of the Blood of Mammals**].—*C. R. Acad. Sci., Paris.* **209.** 360-362. [6 refs.]

Studies were made upon the Na content of whole blood, cells, plasma and serum of a wide group of mammals. These included pigs, elephants, horses, cattle, camels, sheep, goats, llamas and various species of deer. Serum Na of these animals appeared to be constant within the range of 0·336-0·424 g. per 100 ml. and plasma Na had a very similar range. Whole blood Na showed a much wider variation (0·261-0·405 g. per 100 ml.) and in view of the relative constancy of the plasma, this variation is reflected principally in the Na content of the corpuscles (0·32-1·37 g. per 100 ml.). Furthermore, this wide range of cell Na content is responsible for the wide cell-to-plasma ratios of 0·29:0·98. The data should prove a valuable starting point for further investigations in which blood Na analyses are involved.—Alfred Eden.

Hammon, W. D. (1940). **The Cellular Blood Elements of Normal Kittens.**—*Anat. Rec.* **76.** 259-270. 2 figs., 5 tables. [9 refs.] [Author's summary copied *verbatim*].

In connection with a study of feline malignant panleucopenia an attempt has been made to establish certain normal limits of variation for the cellular blood elements of kittens. The distribution of 222 leucocyte counts made on sixty-six kittens has been analyzed. The logarithms of these counts were found to coincide closely with a normal chance distribution. A curve has been plotted whereby one can determine the probability of encountering counts above or below any selected point. Mean differential cell counts have been grouped according to the magnitude of the total and presented in percentages and mean numbers. Our own data on the total leucocytes, differential leucocyte counts and total erythrocytes have been compared with that of other workers. A few observations on immature erythrocytes and on erythrocytic fragility made by us on kittens has been similarly treated.

Schultze, M. O. (1940). **Metallic Elements and Blood Formation.**—*Physiol. Rev.* **20.** 37-67. [Numerous refs.]

This review of blood formation is limited to the formation of red blood cells and of haemoglobin. Components of the latter, iron, globin and protoporphyrin IX are considered in turn, the two last being elaborated by the haematopoietic centres. Haemoglobin is apparently formed in one of the two following manners :-

(1) protoporphyrin + Fe^{+++} → protohaematin → protohaeme (+ globin) → Hb ; (2) globin-protoporphyrin + Fe^{++} → Hb.

Various methods for the study of the relation of metals to blood formation are described. The roles of pre-natal Fe stores and their metabolism in infancy, of tissue and storage Fe and of dietary Fe in haemoglobin formation are each discussed. Ferrous salts have been shown clinically to be more efficient than ferric salts in haemoglobin formation, while ferrous ascorbate intravenously injected has given promising results. Blood, besides containing most of its iron as haemoglobin, also contains two other fractions :– (a) plasma Fe, and (b) " easily-split-off " Fe in the R.B.C., and Fe transport has now been definitely associated with (a). Besides its role in Hb formation, Fe appears to have a stimulating effect on erythropoiesis, and it still remains to be determined how far the later stages of cellular differentiation are affected by Hb synthesis. The relationship of Cu to blood formation in man and in animals including sheep, swine, dogs and chickens is now established. The form of Cu in tissues and in blood is also considered, and the relevant literature on changes in blood copper level in regard to blood regeneration is carefully reviewed. Cu, although not a constituent of the Hb molecule, apparently exerts its effect in the stages of erythrogenesis preceding the reticulocyte. Identification of several enzymes as Cu-protein compounds has shown the importance of Cu in the control of various intracellular reactions.

The effect of Co in producing a polycythaemia and its relation to animal nutrition is considered with extensive reference to the Australian work on various sheep diseases.

There is no conclusive evidence that metallic elements other than Fe, Cu and Co play any direct part in the formation of erythrocytes and of haemoglobin.

—Alfred Eden.

Ebert, R. H., & Florey, H. W. (1939). **The Extravascular Development of the Monocyte Observed** *in vivo*.—*Brit. J. exp. Path.* **20.** 342-356. 2 text figs., 56 figs. on 8 plates. [Numerous refs.]

Using a modified Sandison-Clark chamber in rabbits' ears, the authors traced the extravascular development of the blood monocyte. The modifications included, (1) a reduction in the thickness of the buffers, enabling areas of 30μ thickness to be observed, (2) a technique which ensured that, in observation of the reaction of cells to injury in organized tissue, the cut edge lay over a completely transparent portion of the central plug, and (3) an improved method of fixing the chamber and ear to the mechanical stage. The chamber is thus held so rigidly that nembutal anaesthesia is unnecessary and the cover slip is parallel to the objective lens. Sub-stage illumination is also increased. The three dyes used were vital new red, pontamine sky blue and trypanblue.

Individual monocytes were observed to migrate from a blood vessel into an organizing clot or in response to a mechanical injury. They then increased in diameter from about 10μ to an average of 30μ and became what are termed macrophages, ingesting the clot and debris. Further development was seen to consist of a clarification of cell protoplasm and the appearance of refractile droplets, which later disappeared, to be replaced by deeply staining granules. A clear space, corresponding to the nucleus, appeared to one side of the cell. The cells now exactly resembled histiocytes, orientating themselves along the blood vessels with their long axis parallel to the direction of the vessels, although some lay in the connective tissue. The authors believe that their observations confirm the view that monocytes develop through stages into a cell which is indistinguishable from a histiocyte.

Whilst it was made certain that the monocyte was capable of developing extravascularly into a cell indistinguishable from a histiocyte, it could not be proved that all the macrophages present at the developing edge originated from monocytes. Observations are reported, however, which suggest that they all did in fact originate from the monocytes.—H. V. Hughes.

Kovács, A. (1936). Egyes háziállataink bőrének és szőrének cystintartalma. [**Cystine Content of the Skin and Hair of Some Domestic Animals**].—*Thesis, Budapest.* pp. 8. 1 table. [German summary].

The cystine content of skin and hair samples of horses, cattle, pigs and dogs was determined by means of the Rimington modification of the Folin-Looney colorimetric test. The samples were hydrolyzed for three hours in an autoclave with N/10 HCl at a pressure of 3 atm. after which the cystine content was found to be :– 0·73 % in the skin and 7·58 % in the hair of horses ; 0·71 % in the skin and 5·17 % in the hair of cattle ; 0·76 % in the skin and 3·52 % in the bristles of pigs, and 0·61 % in the skin and 9·03 % in the hair of dogs. The values varied in samples taken from different regions of the body and the figures quoted are averages.

—E. Martin.

Szabó, J. (1937). A szarvasmarha és ló vizeletének fenoltartalma. [**Phenol-Content of the Urine of Cattle and Horses**].—*Thesis, Budapest.* pp. 12. 2 tables. [Numerous refs.] [German summary].

The urine of 32 cattle and 17 horses was examined according to the Penny-Mooser-Hensel method, and it was found that the phenol content of cattle urine ranged from 700-1,200 mg. per 1,000 c.c. Pregnant cows showed the highest values. The figure for horse urine was lower, the range being 330-990 mg. per 1,000 c.c. It is suggested that this variation in the phenol content is due to differences in diet.—E. Martin.

TECHNIQUE AND APPARATUS

Ryu, E. (1939). **On the Gram-Differentiation of Bacteria by the Simplest Method. II. The Caustic Potash Method.**—*Jap. J. vet. Sci.* **1.** 204-210. 1 table. [8 refs.] [In Japanese : abst. from English summary]. [For part I, see *V. B.* **10.** 393].

A small loopful of 24-hour culture on agar is mixed on a slide with a drop of 3 % caustic potash. If Gram-negative bacteria have been used for the test, the mixture becomes viscous and rapidly turns into a gelatinous mass. This does not occur in the case of Gram-positive bacteria. On examination of bacteria stained after treatment with the caustic potash, the bodies of Gram-negative bacilli are seen to have become thin. This is not the case with Gram-positive bacilli.

—F. T. Boyle.

Knox, R. (1939). **Desiccation of Filterable Tumours and Other Biological Materials.**—*J. Path. Bact.* **49.** 467-481. 1 text fig., 1 fig. on 1 plate. [12 refs.]

A detailed description is given of the apparatus used for the desiccation of tumour material, immune sera and complement by means of low temperature condensation. The material to be dried is distributed in small amounts in special glass bottles and is rapidly frozen to –78° C. in solid CO_2 in alcohol. The bottles are attached to the apparatus and a high vacuum (0·0005 mm.) is maintained until

drying is complete. The bottles are then sealed *in vacuo* and stored in the ice-chest until required.

Desiccates of immune sera and complement showed no loss of titre after months of storage. Extracts of Rous sarcoma and other tumours were tested on fowls in both the fresh and dried states; no appreciable difference in activity could be observed. Highly active Berkefeld filtrates of Rous sarcoma were found to lose their activity after desiccation.—E. C. Hulse.

Macfarlane, R. G. (1939). **A Simple Method for Measuring Clot-Retraction.**—*Lancet.* **236.** 1199-1201. 3 figs., 2 tables. [10 refs.]

A method for measuring clot retraction is described. Retraction was found practically completed 60 minutes after clotting. There is an increase both in the rate and maximal extent of retraction with rises in temperature up to about 47°C., after which retraction is inhibited. Below a variable figure (in the neighbourhood of 100,000 per c.mm.) a reduction in the number of platelets is accompanied by a reduction in retraction. Clot retraction in various pathological conditions is discussed.—F. T. Boyle.

Malterre, Ginièis, Guérillot, & Berthaud. (1939). Un procédé de stérilisation du colostrum. [**Sterilization of Colostrum**].—*Bull. Acad. vét. Fr.* **12.** 354-362. 1 table. [3 refs.]

In order to sterilize colostrum without inducing coagulation use was made of the proteoses of the papaw (*Carica papaya*). A water extract of the fruit, containing the enzymes, was added to the colostrum; the temperature of the mixture was raised rapidly to 40°C. and then heated so that the rise from 40°-90°C. took 25 minutes with constant stirring. If any flocculation occurred between 60°-70°C. it was necessary to remove the heat, increase the rate of stirring and add more papaw extract, then reheat slowly. After this the mixture was allowed to boil on an open flame for 20 minutes to kill bacteria and destroy the papaine which might harm the calf.

This colostrum solution contains the normal laxative properties of the original colostrum, but not the antibodies for septicaemia.—R. Allcroft.

Bauer, J. T. (1939). **Use of Solid Carbon Dioxide in Preparation of Gross Pathologic Specimens.**—*Arch. Path.* **28.** 396-397. 1 fig. [2 refs.]

With specimens prepared in this manner, it is claimed that within 36 hours gross sections can be sawn in any plane without distorting the tissues or disturbing their relationships, that blocks can be taken for histological examination, and photographs obtained with complete absence of reflection. The method is especially good for colour photographs, as the natural colours are preserved.

—C. W. Ottaway.

Bennett, H. S. (1940). **Nitrocellulose in Amyl Acetate as an Embedding Medium.**—*Anat. Rec.* **76.** 233-239. [7 refs.] [Author's summary copied *verbatim*].

Hercules Powder Company nitrocellulose RS 1/2 Sec. viscosity dissolved in amyl acetate is recommended as an embedding medium, and directions for its use are given. This method has distinct advantages over most other methods with respect to expense, ease of preparation, rapidity of infiltration and embedding, transparency and toughness of the resulting block, and ease of cutting in thin or thick sections.

PUTNAM, T. J. (1939). **A Simple Method of Preparing Lantern Slides of Histologic Specimens in Two Colors.**—*Arch. Path.* **28.** 398-399. [1 ref.]

Histological specimens stained with haematoxylin-eosin, methylene blue-eosin or any other combination of dyes in which blues and reds only are represented, may be inexpensively reproduced as lantern slides by combining toning, mordanting and staining. From the negative a positive lantern slide is prepared with the blues represented by dark-grey and the reds by light tones. The negative is then toned to the required colours. The formulae of the toning solutions and details of procedure are given.—C. W. OTTAWAY.

WEISS, R. (1938). Automatische Gasbrennerregulierung durch den Nadelhalter. [**Automatic Regulation of the Bunsen-Burner Flame by the Inoculation Needle-Holder**].—*Zbl. Bakt. I.* (*Orig.*). **143.** 157-159. 2 figs.

The gas supply for the bunsen burner is passed through the inoculation needle-holder, and is controlled by means of a valve operated by the weight of the platinum needle. A bypass or pilot flame is kept burning; when the needle is lifted this lights the released gas. The needle may then be sterilized, used and resterilized, and replaced on the holder, the burner then being automatically extinguished.

I. MERLING-EISENBERG, K. B. (1937). **Further Observations on the Limits of Resolution and Visibility of the Microscope.**—*J. Quekett micr. Cl.* Ser. 3. **1.** 311-323. 5 text figs., 11 figs. on 1 plate. [Numerous refs.]

II. MERLING-EISENBERG, K. B. (1937). **Direct Microscopical Measurements of Virus Bodies.**—*Ibid.* 324-332. 1 fig., 1 table.

I. By the use of special methods with dark ground illumination of low intensity, the author was able to show that the resolving power of the microscope, by direct observation, is beyond the theoretical limits. The formula should be amended to include a factor I for light intensity. No value is given for this I (intensity) factor.

II. Three methods of direct measurement, using dark ground illumination, are available for small objects. (1) With the eyepiece screw micrometer the limit of resolution is reached at $0{\cdot}1\mu$ when the object to be measured is immersed in a liquid of the same refractive index as its surface layer. This limit seems to be also the limit of the ordinary screw micrometer. (2) With an adjustable objective the aperture at which the object becomes resolved is a function of the size of the object. The limit to this method is about $0{\cdot}08\mu$. (3) With the microscope fitted with polarizers the angle of rotation of the polarizers and therefore the intensity of the light is a function of the size of the object. The limit to this method is $0{\cdot}03\mu$.

It is pointed out that before measurements can be made of virus bodies, long observation is necessary to be able to distinguish virus particles from extraneous matter in the field of view.—G. SLAVIN.

MISCELLANEOUS

KELLEY, R. B. (1939). **Zebu (Brahman) Cross Cattle and their Possibilities in North Australia. Co-Operative Investigations in Queensland.**—*Progr. Rep. Coun. sci. industr. Res. Aust.* No. 3. pp. 30. 15 plates, 3 tables.

It is now five years since the Zebu cattle referred to in this third progress report were imported from America to Australia. During this period the number of progeny of the original importation, which itself numbered 19, has become

1,193 comprising 26 three-quarter breds, 630 half breds and 548 quarter breds. The oldest of the half breds are approximately three and a half years old, while the majority of the three-quarter breds are scarcely more than yearlings.

Although sufficient evidence is not available to satisfy all the requirements of the investigation, certain points of interest have been established and others have received strong support. It would seem, for instance, that for the open or semi-open runs the one-quarter bred is likely to combine most effectively the requirements of hardiness and tick resistance with a satisfactory degree of tractability. On the more intensively worked coastal properties a higher percentage of Zebu blood would seem permissible.

The evidence available with regard to the hybrid carcass type, though much careful observation is still necessary, indicates that carcasses carrying as high as 50% Zebu blood are likely to meet export market requirements satisfactorily. This is strongly supported by overseas observations and reports.—H. B. CARTER.

OFFICIAL AND OTHER REPORTS

—. (1939). Rapport administratif du Directeur de l'Office pour l'année 1938-1939. **[Administrative Report of the Director, Office International des Epizooties for the Year 1938-1939].** [LECLAINCHE, E.]—*Bull. Off. internat. Epiz.* **18.** 349-353.

The Director again deplores the lack of uniformity in the reports on animal diseases sent in to the *Office* by the various countries.

During the year the *Office* made a grant to Professor Zagrodsky of Pulawy, Poland, for research into non-specific agglutination in BRUCELLOSIS.

The address of the *Office* was changed during 1938 and is now 12, Rue de Prony, Paris (17e).—J. E.

LECLAINCHE, E. (1939). La situation sanitaire en 1938. **[The Animal Disease Situation in Europe in 1938].**—*Bull. Off. internat. Epiz.* **18.** 5-16. 3 tables. [1 ref.]

As usual [see *V. B.* **9.** 128.] there is here given a summary, in countries participating in the *Office*, of the incidence of anthrax, glanders, swine erysipelas, fowl cholera, blackleg, epizootic lymphangitis, dourine, foot and mouth disease, contagious bovine pleuro-pneumonia, sheep pox, swine fever and rabies.—J. E.

MCEWEN, A. D. (1939). **Work of the Veterinary Department, South Eastern Agricultural College, Wye, during 1938.**—*J. S. E. agric. Coll. Wye.* No. 43. pp. 41-44. [7 refs.]

Immunization experiments with different variants of a non-virulent strain of *Br. abortus* (strain 45) were continued. It was found that g. pigs vaccinated with the variants which are only slightly virulent, acquire an immunity to infection with virulent strains superior to that shown by animals vaccinated with the original non-virulent strain 45.

The two variants which were studied most closely were the 6th passage variant and the 20th passage variant. On inoculation into g. pigs the 6th passage variant disappeared more rapidly from the tissues than did the 20th passage variant, and appeared to be the less virulent of the two. The 20th passage variant was found to have undergone a change from the smooth to rough phase and did not produce agglutinins in inoculated g. pigs. The virulence for cattle of the 6th and the 20th passage variants was tested with a view to the use of such a variant for the vaccination of cattle in the field. The 20th passage variant was found to

produce abortion and infection of the udder on inoculation into pregnant susceptible cattle. The strain which was recovered from the udder was found to have regained its virulence. The 6th passage variant on inoculation into cattle did not produce abortion, but the organism was recovered from two of the five cattle inoculated, in one case from the foetal membranes and the milk, and in the other from the foetal membranes only. The 6th passage variant, while less virulent for cattle than the 20th passage variant, was considered unsafe for vaccination of normal untreated pregnant cattle. From experiments it seems probable that a preliminary vaccination of cattle with the non-virulent strain might protect them against subsequent inoculation with the passaged variants and the combined inoculation render them more resistant against infection than animals inoculated with only the non-virulent strain.

An experiment was carried out to find a suitable infective dose of *Br. abortus* for cattle, using 50 heifers, mainly in the 5th month of pregnancy. Infection was by means of *Br. abortus* culture instilled into the eye. The optimum infective dose, when given by this route, was found to be in the neighbourhood of 1,500,000 bacteria of the strain used.

Ten cattle which had previously been used to test the innocuity of strain 45 were again inoculated with this strain, and when pregnant their immunity was tested. Five of the cattle were given an infective dose of 1,500,000,000 bacteria, and five a dose of 15,000,000 bacteria. The resistance of the vaccinated animals was overcome by the larger infective dose, but with the smaller dose there was a greater resistance to infection than in the non-vaccinated or control animals.

Field vaccination experiments have been continued with promising results.

Experiments were continued on the toxicity of *Br. abortus* when large numbers of the organisms are injected intravenously or intraperitoneally into mice. It was found that the toxicity of *Br. abortus* increases with an increase in virulence; it is suggested that an indication of virulence may be obtained rapidly and cheaply by using the toxicity test on mice instead of virulence tests on g. pigs.—F. Boyle.

Great Britain. (1939). **Sixteenth Annual Report of the British Empire Cancer Campaign.** pp. 368. 5 figs., numerous tables, 2 graphs, 9 maps. [Numerous refs.] London: British Empire Cancer Campaign. [4to].

This report is prefaced by a useful index and a summary of 19 pages.

Recent work by Carr at the Lister Institute has shown that the Rous no. 1 tumour agent contains at least two antigenic constituents; one is capable of producing antibodies in fowls and is related to the virus, the other is closely related to an antigen normally present in fowl cells. Work on the chemical nature of the Rous agent carried out by Pollard at the Courtauld Institute of the Middlesex Hospital has shown that it consists of protein bound up, probably loosely, with a variable amount of lipoid substance.

McIntosh and Selbie have demonstrated that sarcomata produced in fowls by the injection of tar resemble natural sarcomata in this species in that they can be transmitted in series by cell-free filtrates. This finding brings the fowl tumours into line with other malignant tumours, whereas there was previously a tendency to consider them as essentially different in that they are caused by a virus.

An experimental investigation, lasting many years, on the relation between gall stones and cancer has been completed. Gall stones and other foreign bodies were placed in the gall bladder of 50 g. pigs and in no case did cancer develop in the gall bladder or other organs. This result is considered to support the view that irritation, in the absence of a specific carcinogenic factor, is not a cause of malignant tumours.

An interesting observation was made on the lymph nodes of mice with artificially induced sarcomata. Three types of histological change have been observed :– (a) proliferation of reticulum cells with widening of the lymph sinuses and diminution in lymphocytes ; (b) replacement of lymphoid tissue by spindle cells similar to those of the tumour, the change often occurring in many lymph nodes on both sides of the body, and (c) lymphoid hyperplasia. Portions of such lymph nodes inserted beneath the skin of healthy mice may give rise to spindle-celled tumours at the site of implantation.

The report contains a very considerable amount of information on recent research into the cancer problem, most of which has already been published.
—E. G. White.

Australia, Queensland. (1938). **Report of the Director, Animal Health Station, Yeerongpilly, 1937-38.** [Rudd, J. A.]—*Rep. Dep. Agric. Qd, 1937-38.* pp. 109-116.

The major portion of the work carried out during the year was in the nature of advice to farmers and graziers on matters pertaining to animal husbandry. Whenever practicable the services of a veterinarian were made available for the investigation of stock mortality or disease and for devising curative and preventive measures. The preparation and distribution of vaccines and other biological products has formed a large part of the Station's work and wherever possible these have been despatched by aeroplane.

Cattle Lice.—The results of a survey showed that *Haematopinus eurysternus* is the most common and important cattle louse in the State, with *Linognathus vituli* next in importance. *Solenoptes capillatus* and *Bovicola bovis* were also frequently found.

Ephemeral Fever of Cattle.—The survey of biting insects in the Yeerongpilly area has been continued. A list of the principal species captured is presented. No transmission work with these species has yet been carried out.

Dog Fleas.—A survey of fleas present on dogs in the Brisbane area was made. *Ctenocephalides felis* comprised 65% of the total and *C. canis* 33·4%. *Pulex irritans* comprised 1·3% of the number examined.

Gastro-Intestinal Helminths of Cattle.—The results of this survey will be published shortly.

Tick Fever Immunization.—Inoculation against the tick fevers continues along the lines previously laid down. Excluding *Theileria mutans* which appears to be harmless, the three species *Babesiella argentina*, *Babesia bigemina* and *Anaplasma marginale* are all associated with tick fever in Queensland. The important feature of the large number of outbreaks during the year has been the preponderance of fatalities due to *Babesiella argentina*. More than 90% of the outbreaks are now recognized as being due to this organism and this is remarkable as the parasite was unknown in the State until within the last five years. Up to the present, a vaccine containing *Babesia bigemina* of Australian origin and *A. centrale* of South African origin has been used. Experiments have since shown that carriers of *Babesia bigemina* are resistant to infection with *Babesiella argentina*, though the converse does not hold good. Recent evidence indicates, however, that *Babesia bigemina* does not invariably confer this resistance and though the introduction of a third organism into the vaccine is, for many reasons, undesirable, the question of introducing *Babesiella argentina* has had to be considered.

Acaprin has been widely used in the field and has been found very useful. It has undoubtedly reduced losses in stock since its introduction and seems effective against natural babesiella infection if used in time.

Contagious Bovine Pleuro-Pneumonia.—Twenty outbreaks were reported during the year in north Queensland. In each instance the disease was brought under control by quarantine and inoculation of in-contact animals.

Research on Animal Production.—During the year observations were carried out on beef production on specially prepared pastures on the coast in the Tully and Innisfail districts of the " wet belt ", with average annual rainfall of 150 inches, and in the Charters Towers district with a rainfall of 20 inches. The special pastures in the Tully area consisted of Para grass (*Panicum muticum*) with a small percentage of Molasses grass (*Melinus minutiflora*) and Guinea grass (*Panicum maximum*). Thirty-eight bullocks were marketed off the area, 90% being graded as first quality export chillers and 10% as second quality.—H. B. Carter.

Australia, Queensland. (1938). **Report of the Agricultural Chemist, 1937-38.** [Gurney, E. H.]—*Rep. Dep. Agric. Qd, 1937-38.* pp. 130-132. 1 table.

In the investigation of suspected poisonous plants, 157 examples have been examined, most of which were tested for their HCN content, although in some the presence of an alkaloid has been detected. Periodical quantitative analyses have been made on known cyanogenetic plants to determine the seasonal variation in HCN content. The plants tested were: *Ximenia americana*, *Heterodendron olaefolium* (broad- and narrow-leafed forms), *Eremophila maculata* and *Andrachne decaisnei*. These data are summarized in a table.—H. B. Carter.

Colony of the Gambia. (1939). **Report on Veterinary District Work, 1938-39.** —*Rep. Dep. Agric. Gambia, 1938-39.* p. 9.

During the dry season which terminated in June 1939, 11,832 cattle were vaccinated against Rinderpest. The whole colony has now been covered once in the rinderpest control plan which started in 1933. During the six years a total of about 36,000 cattle has been immunized.—J. E.

Nigeria. (1939). **Annual Report on the Veterinary Department of the year 1937.** [Henderson, W. W.] pp. 48. 4 tables, 2 appendixes. Lagos: Govt. Printer. [fcp] [4s.]

The control of Rinderpest is still the major occupation of the Department and active immunization by the serum-virus method is relied upon in dealing with the cattle of the Northern Provinces, where there are large herds owned by nomads. A vaccine made from formalinized spleen pulp is, however, used for immunizing herds infected with Trypanosomiasis and also for treating the susceptible trade cattle imported from the French Colonies. Blackquarter vaccine is used on a large scale (427,284 cattle inoculated) both at the time of Rinderpest inoculation and in the provinces where the disease is enzootic. Contagious Bovine Pleuro-Pneumonia is dealt with by the use of an attenuated culture of the organism as a vaccine (138,249 cattle inoculated). There were 36 cases of canine Rabies. Clarke reports that one dog became infected six months after vaccination; the diagnosis was confirmed by tests at the veterinary laboratory. In the control of Anthrax an attenuated spore culture to which saponin is added, is used as a vaccine; 34,245 animals were treated and of these 18,185 were sheep and goats. Foot and Mouth disease is enzootic but is usually only seen in a mild form.

Trypanosomiasis causes mortality among both horses and cattle, particularly when they are undernourished or affected with other diseases. The disease presents a problem in the attempted development of tsetse-infested areas, which involves the use of cattle to provide manure, and in some parts also to work implements for the cultivation of the land.

In the Bamenda division of the Cameroons (Mandated Territory) TUBERCULOSIS has been found by O'BRIEN to affect 15% of the cattle, and among the old cows up to as many as 80% were reactors to the tuberculin test. The higher incidence of tuberculosis among the cattle of the Gudali breed is believed by O'Brien to be due not to breed susceptibility but to greater exposure to infection from close contact with cattle imported during the German occupation. The Gudali breed resembles closely the English Hereford breed. The Cororo cattle are large red animals with long horns. Tuberculosis is rare among these but Gudali-Bororo crosses readily become infected. In Bamenda 12·5% of the human population is also stated to be infected with tuberculosis (only a small proportion use milk as part of their diet but beef is eaten to some extent). In the large herds of zebu (Fulani) cattle of the northern part of Northern Nigeria, tuberculosis is a very rare condition.

HELMINTHIASIS is common in cattle, sheep and goats and is particularly noticeable when grazing is scanty. Mass treatment has been attempted by BEST in Bauchi Province and a definite reduction in the mortality among young animals has been noted.

Details are given of the work of the animal clinics. An elementary course of training for native assistants is given at Kano Veterinary Centre. The livestock census shows an increase of all species except sheep. Figures are :– cattle 3,052,278, sheep 1,919,601, goats 5,620,250, horses 176,908, donkeys 466,571, camels 2,030 and swine 66,169.

A large part of the report deals with animal husbandry, control of slaughter stock, movements by road and railway, the export of livestock, production of milk and milk products, as well as the important trade of Northern Nigeria in hides and skins.—J. A. GRIFFITHS.

ALBANIA. (1938). Relacioni veterinar 1928-1938. **[Report of the Veterinary Service 1928-38]**. [SAMIM, V.]—*Dhjet. vjeçori shërbimit veteriner e zooteknik.* pp. 29-62. 4 tables, 2 charts, 25 photographs. Tirana: Shlepija botonjëse "Kristo Luarasi". [Abst. from French summary]. [French summary also appeared in *Bull. Off. internat. Epiz.* **17.** 713-716. (1939)].

The personnel in each prefecture, sub-prefecture, and important district was one veterinary surgeon, one "veterinary assistant", and one veterinary guard. There were 28 students from Albania in various European veterinary colleges.

The total animal population was 6,500,000. During this period, the value of the animals treated for contagious diseases was 3,255,794 gold francs and of those saved from minor diseases 2,110,225 gold francs.

There were 400,800 cases of infectious and parasitic diseases in cattle, and the number of deaths caused was 76,184. Parasitic diseases (strongylosis, mange, distomatosis) are prevalent.

By 1937 the number of villages under the control of the Veterinary Service was 1,500, and the number under the regular supervision of the veterinary police 2,555.

120,000 cattle were vaccinated against ANTHRAX in 1929; in 1937 the figure was 660,000.

In 1928 there were 35,000 cases of SHEEP POX (32 in 1932) and 5,500 cases of CONTAGIOUS PLEURO-PNEUMONIA in goats (none in 1932). 3,279 animals were treated in 1928 for minor diseases at the dispensaries operating in each prefecture. In 1937 this number had risen to 23,529.

Control of animal foodstuffs was commenced in 1928. In that year the meat inspection work involved the inspection of 369,960 carcasses, while in 1937 the number was more than 420,000.

In 1928, a veterinary bacteriological laboratory was founded at Tirana.

Control of animals and animal products for exportation was begun in 1928. Figures are given.

It is stated that the veterinary position is good as compared with that in the other Balkan and other European countries. Albania is now free from the following diseases :– contagious pleuro-pneumonia of goats, sheep pox, swine erysipelas, bovine contagious abortion, swine fever, and salmonellosis.

GERMANY. (1939). Die Verbreitung von Tierseuchen und die Ergebnisse der Schlachtvieh- und Fleischbeschau im Jahre 1936. **[The Animal Diseases and Abattoir Returns for 1936]**. pp. 123. 2 graphs, 4 charts. Berlin : Paul Schmidt. [4to] [RM. 6.50].

This report gives statistical and other details of the incidence of notifiable diseases in Germany, particulars of compensation paid and abattoir returns.

The following diseases were present :– anthrax, tuberculosis, glanders, swine erysipelas, fowl cholera, blackleg, foot and mouth disease, Borna disease, equine infectious anaemia, genital vesicular exanthema, swine fever and swine plague, rabies, fowl plague, infectious vaginitis of cattle, and mange in horses, cattle and sheep.

No outbreaks were notified of strangles, haemorrhagic septicaemia, dourine, rinderpest, contagious bovine pleuro-pneumonia or sheep pox.—J. E.

HOLLAND. (1939). Verslag van den veterinair hoofdinspecteur van de volksgezondheid, belast met het toezicht op de naleving van de vleeschkeuringswet, staatsblad 1919, No. 524, over het jaar 1938. **[Report of the Chief Veterinary Public Health Inspector for 1938]**. [BERGER, H. C. L. E.] pp. 150. Numerous tables. [4to].

This report gives, as usual, details of the meat inspection work in the various provinces and towns of Holland. Some figures are given for the number of cases of TUBERCULOSIS, JOHNE'S DISEASE, CYSTICERCOSIS and ECHINOCOCCOSIS.

Only two cases of MEAT POISONING were observed, one of BOTULISM from pork and another of botulism from a ham which had been hung for two years.—J. E.

ITALY. (1937). Il Servizio veterinario del Governatorato di Roma. Relazione sulla attività svolta per il settennio 1929-1935. **[Report of the Veterinary Service, Rome, for the Seven Years 1929-1935]**. [FICOLA, G., & TORTI, E.] pp. 239. Numerous figs., numerous tables. Rome : Tipografia F. Centenari. [4to] [8s. 6d.]

ORGANIZATION.—The Veterinary Service of Rome was enlarged in 1929 to comprise a chief veterinary inspector, a director of the abattoir and 20 veterinary inspectors (eight for food inspection, seven for animal disease control, two for the livestock markets, two for the inspection of meat imported by railway and one for miscellaneous duties).

VETERINARY SERVICE OF THE ROMAN PLAINS.—This section describes animal husbandry, livestock diseases and milk inspection.

ANTHRAX and BLACKLEG occurred to a small extent and were controlled by immunization. BOVINE TUBERCULOSIS is not wide-spread ; GLANDERS was observed up to 1933 only. Two cases of EPIZOOTIC LYMPHANGITIS were observed in each of the years 1929, 1932 and 1934. FOOT AND MOUTH disease was prevalent at the beginning of the period but not at the end ; SWINE FEVER outbreaks averaged six in each of the years. RABIES was present throughout the period, only exceeding ten cases per annum in 1933 ; a special service with three motor vehicles for

catching strays was in operation and from 1,905-4,294 stray dogs were captured each year. CONTAGIOUS AGALACTIA of sheep is an important disease in the Roman plains and many large outbreaks occurred early in the period, but only one in 1935. SHEEP SCAB was prevalent throughout and was controlled by sulphur or tobacco dipping. A few other diseases are also mentioned.

Milk hygiene is on a high-grade scale and includes the periodical inspection of dairy cows—care being taken to identify the individuals permanently—tuberculin testing, and inspection of milk after its collection and prior to distribution.

MEAT SUPPLY AND INSPECTION.—Details are here given of the abattoir, livestock and meat market, animals passing through annually and of the meat inspection service (with notes on some diseases diagnosed). In 1932, only 2% of cows and about 1% of other bovines were affected with TB.

VARIOUS.—Notes are also given on the livestock market and lairage, on carcass collection and utilization, on the city kennels where stray dogs are taken for destruction and suspected rabid dogs taken for observation, and on veterinary work in the zoological garden.—J. E.

BOOK REVIEWS

OGILVIE, R. F. [M.D., F.R.C.P. (Edin.), Lecturer in Pathology, University of Edinburgh, Senior Pathologist, Royal Infirmary, Edinburgh. (1940). **Pathological Histology.** pp. x+332. 220 figs. on plates. Edinburgh: E. & S. Livingstone. [8vo] [27s. 6d.]

This book is an atlas of pathological histology in the form of 220 illustrations in natural colour supplemented by a minimum of text. It is intended as a companion to a standard textbook of pathology. Representative histological pictures of the processes of general pathology and of the most important human disease conditions have been faithfully reproduced from transparencies prepared by the Finlay process. The majority of the plates are excellent, but a few are somewhat blurred. The colouring brings out detail which is extremely difficult to obtain by the use of ordinary monochrome photomicrographs. It might be an advantage for the student if the magnification were restricted to three or four fixed values rather than varied widely; this would correspond to the rather limited performance of the ordinary student's microscope, *e.g.* ×300, ×320, ×350, ×370, etc., could well be replaced by a standard value, say ×350.

The text accompanying the illustrations is rather dull, due in part to its brevity and in part to the somewhat obscure style employed. For the student there is no better atlas of morbid histology and the reviewer has already proved its worth in teaching veterinary students who appreciate the great advantage of the colour plates over the black and white photographs, on which previously one was forced mainly to rely.—E. G. WHITE.

MARTIN, C. R. A. [M.R. San. I., Chief Sanitary Inspector, Whitstable]. (1940). **Practical Food Inspection. Volume I—Meat Inspection. Volume II—Fish, Poultry and Other Foods.** pp. vii+316 and pp. vii+275. 196 figs., 1 table. London: H. K. Lewis & Company, Ltd. [2nd Edit.] [8vo] [15s. & 12s. 6d.]

A second edition of these two volumes has been issued, a good indication of appreciation by students using them. The information supplied must be of considerable value to students preparing for the certificates of the Royal Sanitary Institute.

Volume II is the more valuable, as its contents give such varied information.

Volume I on " Meat Inspection " is too elementary to be of much value except to junior students, because experienced veterinary surgeons and qualified sanitary inspectors will have gained so much knowledge and experience that when in doubt they will consult books of reference containing more scientific guidance. The diagrams are crude and of limited value. Good coloured plates would enhance the value of the books and, perhaps, the author may introduce such improvements in further editions.

The publishers have done their part of the work very well and, doubtless, with the improvements suggested, there will continue to be a demand for the books.—T. DUNLOP YOUNG.

BERNAL, J. D. [F.R.S. Birkbeck College, University of London]. (1939). **The Social Function of Science.** pp. xvi+482. 10 tables, 3 charts, 10 appendixes. London: George Routledge & Sons Ltd. [8vo] [14s.]

This stimulating book is an attempt to analyse the connexion between the work that scientists are doing and the social and economic developments in the world around them. Science has ceased to be the occupation of ingenious minds supported by patrons, and has become a great industry supported by large monopolies and by the State. So long as scientific enquiry could be regarded as entirely beneficent, with the assurance that its results would be applied to improvements in general conditions of life, the scientist could afford to remain aloof from the social repercussions of his work and retain his traditional detachment from economics and politics. But the events of the last half century, particularly the last decade, have shown how effectively science can be applied to destructive ends, to disproportionate development of commercially profitable applications at the expense of those of more immediate value to social welfare. Scientific advances have outpaced the moral and political development of man and needless poverty persists in an age of plenty. At the same time the number of those engaged in scientific pursuits has increased enormously and the scientist has to consider the impact of his activities upon his own life as a citizen and upon the world politics of his times. Unless scientists work actively with those social forces which understand their functions and march to the same ends, there can only be " frustration of science " ending in ill-balanced utilization of available resources. The book aims at showing that upon the proper relation of science and society depends the welfare of both.

The first half of the volume deals with " what science does ", provides a brief survey of the history of science, discusses the present organization of research in Britain, science in education, efficiency of research and the wastefulness of inefficient organization, the application of science and the distortion of industrial research, science and war, the diversion of research to war uses, international science and its relationship to political ideologies of different countries.

The second half deals with " what science could do ", and discusses the training of the scientist, reorganization of research, scientific communication, finance of science in relation to a properly planned social economy, strategy of scientific advance, speculative applications in the service of man, social transformations and the sociological function of science.

The ten appendixes, occupying 50 pages, provide much useful information on scientific expenditure by government departments and industrial firms.

The social outlook of the author himself is best expressed in his own phrase—" in science men have learned to subordinate themselves to a common purpose without losing the individuality of their achievements ". Apart from library use by the scientifically trained, the book should reach a considerable circle of general readers interested in the integration of science and society.—H. H. GREEN.